

The Empirical Modelling Project

What is Empirical Modelling?

guiding
FARADAY
not just
computer

principles for constructing 'construals' of phenomena, in particular computer models

emphasis not on the product, but on model-building that assists cognitive process of construal *explanatio*

key concepts: agency, dependency, observables, explored within a pragmatic framework

no absolute
explanation

Russell mirror shadows, mechanical links, winning match

significant in respect of pre-articulate activities, pre-formalisation, situated modelling, *complex*

analogy observation - oriented typical, more from abstract modelling

Two major themes

tension: principles vs pragmatism

1. broadening the foundations of science

Stewart/Cohen limitations of math. mod. no diff. equ.

modelling that precedes / complements mathematical modelling

cf. the procedural vs logical rot.

reductionism problem
Bogner, Weyner, Smith, West, non-logicians

computing applications beyond the scope of traditional theory requirements analysis and specification, VR, agent-oriented modelling

retreat from formal

depth of model formal?

interdisciplinary applications: concurrent engineering, CAL, decision support systems

Design/Engineering Education Management

areas of application on fringe of science: psychology, education, management

activities clearly systematic elements, but lack scientific basis

2. supporting the learning process in a novel way

conventional view of learning (esp. computer-assisted) as mediated by language

science socially constructed

of learning via private, particular, tentative experimental interaction with phenomena

of universal, general, reliable

of instruments: private conventions

creative, discovery-led processes supported by the construction of artefacts

for skill acquisition

openness not closed world, static representation not behaviour

giving an experiential account of knowledge (cf. William James)

one experience knows another: cf. knowledge as logic

logic = most primitive

"Computer-related technology liberates the creation of artefacts in form of mechanical systems, tools

Conceptual Foundations for Modern Computing, with potential applications to

of mechanical systems, tools

Wyllie's 1970s, spreadsheet principles for geometry

math model M/C

geometric modelling (Arca 1982, AJC 1989, Matra Datavision 1994-7, Pasko, Aizu 1997)

labelled in app.

concurrent systems reqs software construction

behavioural modelling (British Telecom 1986-88, IBM 1993-6, Adzhiev, MEPhi 1993-97)

LSD notation observation-oriented modelling

LSD engine

new machine architectures (DAM and JaM 1995-7)

dependency transcending levels of abstraction, dependency maintain

concurrent engineering (EPSRC 1993-6, tkeden 1995, Sonnenwald, UNC Chapel Hill 1996)

management of versions Adzhiev Virtual Prototype

educational project (NCET 1997)

EM principles manifest in learning process

cognitive technology (1997)

use of computer that reflects human processes: modelling guided by explanation

business systems (1998)

multi-user spreadsheet, application builders

modelling guided by explanation