information and cognitive science

critique:

planning, learning, designing

April 17, 2012
planning, problem-solving and learning
"AI" and "SA"

problem-solving and design
Simon and Rittel
paradigm shifts

"Three important books appeared in 1986, *Mind over Machine* by Hubert and Stuart Dreyfus, *Understanding Computers and Cognition* by Terry Winograd and Fernando Flores, and *Plans and Situated Actions* by Lucy Suchman [actually 87] .. harbingers of a paradigmatic shift that was to take place within the cognitive sciences"

more general concern?

“[Y]ou don't need to look far these days to find much that is familiar in the world redefined as information. Books are portrayed as information containers, libraries as information warehouses, universities as information providers, and learning as information absorption. Organizations are depicted as information coordinators, meetings as information consolidators, talk as information exchange, markets as information-driven stimulus and response.”

it's information

a conveniently small planet

Grandfather: Well, I finally finished my doctoral thesis.

Woman: Way to go, Gramps.

Grandfather: Did my research at Indiana University.

Woman: Indiana?

Grandfather: Yup. IBM took the school’s library...and digitized it. So I could access it over the Internet.

It’s a great time to be alive.

Tag: IBM. Solutions for a small planet.

She cocks her ear to take this all in.
Gardner's criteria

1. mental representation
2. mind as computer
3. de-emphasize certain factors ...
   unnecessarily complicate the cognitive-scientific enterprise

*The Mind's New Science*
planning, problem solving, and goal achievement

TOTE (test-operate-test-exit)

*Plans and the Structure of Behavior,* George Miller and Karl Pribram, 1960

Logic Theorist (1956) to GPS (General Problem Solver)

*Human Problem Solving,* Allen Newell and Herbert Simon, 1972

"It turned out that one proof was more elegant than Whitehead and Russell's" (Gardner)
plans and problems

understanding humans & computers

plans
instructions
prescriptions
scripts

HCI
interaction & mutual intelligibility
plans and situated actions

introspection and interaction?

from introspection and protocols to ethnomethodology

from interaction between humans and machines
to how humans use machines

"rais[ing] a basic question about the status of plans ... something to be interpreted in context"

"to locate the limit of sense-making ability for machines"
planning to learning

learning
as expected response
"suitably equipped receiver" --Dretske

change of state
altimeters, dolphins, frogs, people, machines

what's not learning, miscommunication, malfunction ... ?
learnings

learning - Charmides

learning - Meno

learning about

learning to be

cp know how and know that

Gilbert Ryle, *Concept of Mind*, 1949
cog sci vs anthropology

characterizing learning

classroom-based assumptions:
  math as paradigm, individual as target

mathematics in the wild

apprenticeship

situated learning

games and goals

"the world of games would appear to offer the best example of well-structuredness ... the immense gap between computability in principle and practical computability in problem spaces as large ...

-- Simon, "The Structure of Ill Structured Problems"

"A lost chess game is seldom consequential for other chess games or for non-chess players"

-- Rittel & Webber, "Dilemmas in a general theory of planning"
in Chomsky's tradition

Vera & Simon, 1993

Vera, 2003