rich work ecologies

Alan Dix
Lancaster University

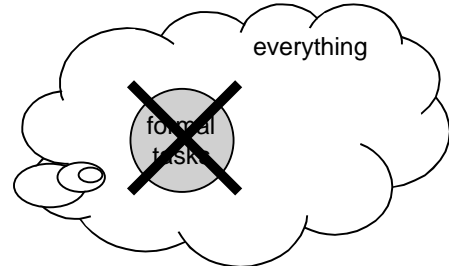www.hcibook.com/alan/papers/Tamodia2002

overview

- the problem

- phenomena of rich interaction

- ? socio-technical Church Turing Hypothesis ??
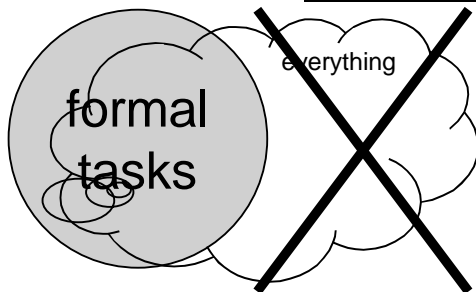
the problem

- task models
  – formal description
- situatedness
  – unique contexts
- ethnography
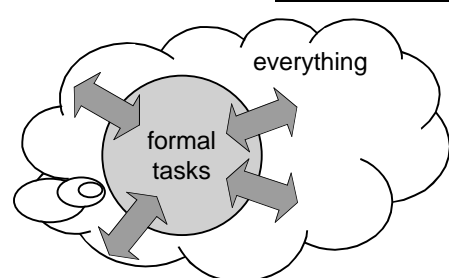 – rich ecologies

bringing them together?

option 1 – reject formalism

everything

formal tasks

option 2 – enforce formalism

formal tasks

everything

option 3 – expand and accept

everything

formal tasks

phenomena

---

phenomena

- collaboration
- information
- triggers
- artefacts
- placeholders

- situatedness
- intentional cycle

+ continuity & duration

---

collaboration

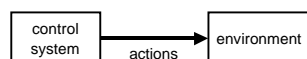- already in several notations
  – e.g. CTT

- add artefacts too ?

---

information

pre-planned cognitive model
      goal ➜ action

situated action
      environment ➜ action

---

control

- open loop control
  – no feedback
  – fragile

```
┌─────────┐           ┌─────────────┐
│ control │  actions  │ environment │
│ system  │─────────▶ │             │
└─────────┘           └─────────────┘
```

---

control

- open loop control
  – no feedback
  – fragile
- closed loop control
  – uses feedback
  – robust

```
        ◀──── feedback ────┐
┌─────────┐           ┌─────────────┐
│ control │  actions  │ environment │
│ system  │─────────▶ │             │
└─────────┘           └─────────────┘
```

adding information

how many cups?

0. pour tea

Plan 0:
1 then 2
when kettle boils 3 then 4

1. boil kettle	2. get out cups	3. make pot of tea	4. pour tea

triggers

process – what happens and order

get post from pigeon hole	→	bring post to desk	→	open post
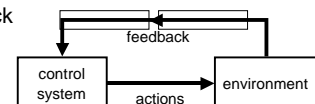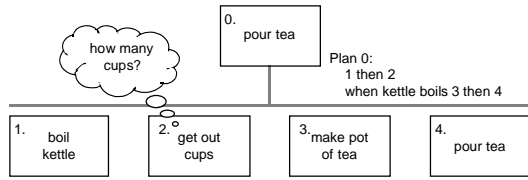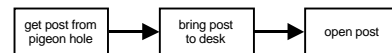
triggers

process – what happens and order

triggers – when and why

first thing in the morning

holding post

at coffee time

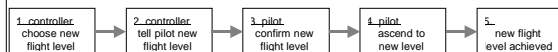| get post from pigeon hole	→	bring post to desk	→	open post
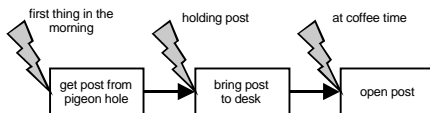
artefacts

- ethnographic studies
- as shared representation
- as focus of activity
- act as triggers, information sources, etc.

9.37	BTN	180	BRITANNIA BAL770 5423 M/B737/C T420	300 EGGW UA2 UB3 UB4 EGAA	CREWE 9.25

placeholders

- knowing where you are in a process
  - like a program counter

- coding:
  - memory
  - explicit (e.g. to do list)
  - in artefacts

where are you?

1. controller choose new flight level	2. controller tell pilot new flight level	3. pilot confirm new flight level	4. pilot ascend to new level	5. new flight level achieved

Slide 1

step 1. choose new flight level

| 1. controller choose new flight level | → | 2. controller tell pilot new flight level | → | 3. pilot confirm new flight level | → | 4. pilot ascend to new level | → | 5. new flight level acheived |

```
9.37   BTN   180   BRITANNIA   300              CREWE 9.25
             220    BAL770
                    5423
             M/B737/C  T420  EGGW UA2 UB3 UB4 EGAA
```

Slide 2

step 3. flight level confirmed

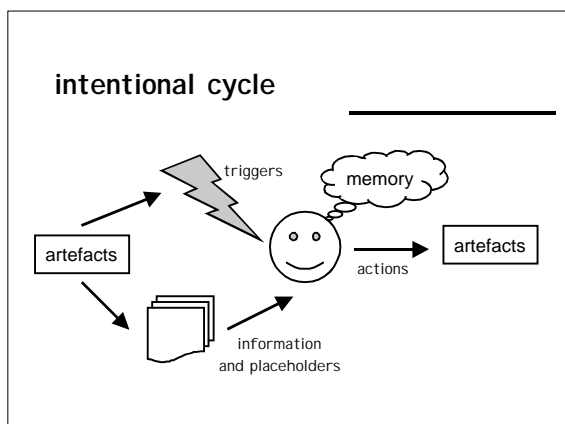| 1. controller choose new flight level | → | 2. controller tell pilot new flight level | → | 3. pilot confirm new flight level | → | 4. pilot ascend to new level | → | 5. new flight level achieved |

```
9.37   BTN   180   BRITANNIA   300              CREWE 9.25
             220    BAL770
                    5423
             M/B737/C  T420  EGGW UA2 UB3 UB4 EGAA

9.37   BTN   100   BRITANNIA   300              CREWE 9.25
                    BAL770
                    5423
             M/B737/C  T420  EGGW UA2 UB3 UB4 EGAA
```

Slide 3

step 5. new flight level acheived

| 1. controller choose new flight level | → | 2. controller tell pilot new flight level | → | 3. pilot confirm new flight level | → | 4. pilot ascend to new level | → | 5. new flight level achieved |

```
9.37   BTN   100   BRITANNIA   300              CREWE 9.25
             220    BAL770
                    5423
             M/B737/C  T420  EGGW UA2 UB3 UB4 EGAA

9.37   BTN   100   BRITANNIA   300              CREWE 9.25
             220    BAL770
                    5423
             M/B737/C  T420  EGGW UA2 UB3 UB4 EGAA
```
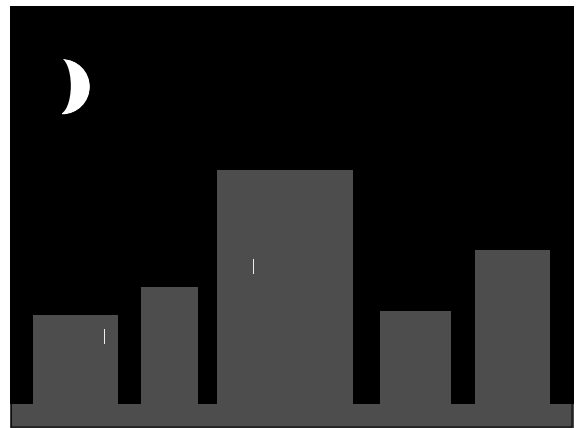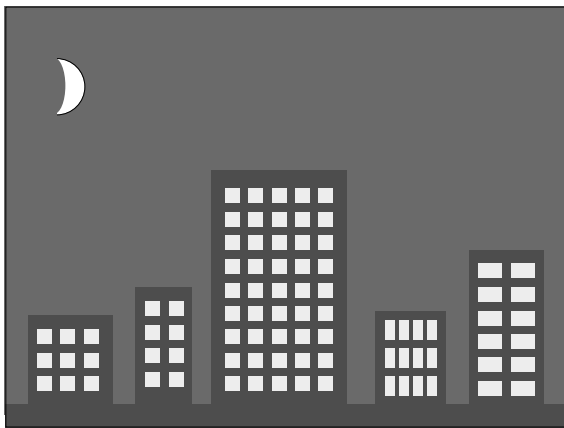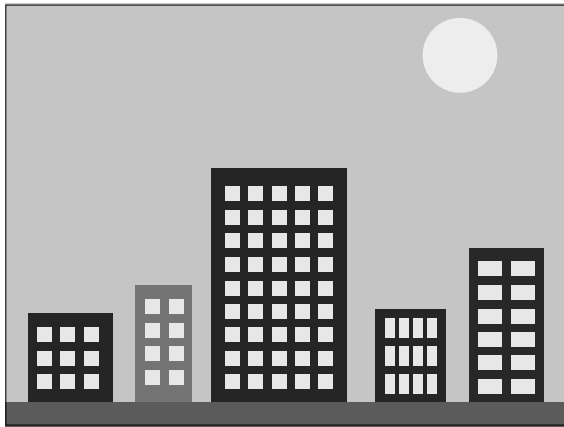
Slide 4

continuity & duration

- system models – event centric

- status–event analysis
  – continuous time (status) and discrete (events)
  – many generic issues and phenomena

- task models:
  – in the annotations and descriptions
  – concurrency – true or interleaved?

Slide 5

intentional cycle

triggers

memory

artefacts

artefacts

actions

information and placeholders

Slide 6

the socio-organisational Church-Turing hypothesis

the Church-Turing thesis

- the THEOREM
  - Church's lambda calculus and Turing machines are 'equivalent'

- the POSTULATE
  - all computation is 'equivalent'

organisations

- are politcial, social, economic ...
  but are also ...

- information processing entities
  so ...

the socio-organisational Church-Turing hypothesis

similarities to computers and cognition

• computational power

• computational structure

---

the organisation as a computer

• computer: program and data
• organisation: process and information
    plus …
• computer data:
    LTM, STM, program counter
• organisation: ????
    files, papers …   placeholders

---

parallels

	computer	cog sci	organisation
process	program	procedural memory	processes
data	data	LTM	files
placeholder	program counter	STM, activation	location of artefacts
initiative	interrupts, events	stimuli	triggers

---

parallels

	computer	cog sci	organisation
process	program	procedural memory	processes
data	data	LTM	files
placeholder	program counter	STM, activation	location of artefacts
initiative	interrupts, events	stimuli	triggers
interpretation	???	???	people