chapter 14
communication and collaboration models

CSCW Issues and Theory

All computer systems have group impact
- not just groupware

Ignoring this leads to the failure of systems

Look at several levels – minutiae to large scale context:
- face-to-face communication
- conversation
- text based communication
- group working

Face-to-face communication

- Most primitive and most subtle form of communication

- Often seen as the paradigm for computer mediated communication?
Transfer effects

- carry expectations into electronic media ...
  ... sometimes with disastrous results
- may interpret failure as rudeness of colleague

  e.g. personal space
  - video may destroy mutual impression of distance
  - happily the ‘glass wall’ effect helps

Eye contact

- to convey interest and establish social presence
- video may spoil direct eye contact
  (see video tunnel, chap 19)
- but poor quality video better than audio only

Gestures and body language

- much of our communication is through our bodies
- gesture (and eye gaze) used for deictic reference
- head and shoulders video loses this

So ... close focus for eye contact ...
... or wide focus for body language?
Back channels

Alison: Do you fancy that film ... err ... 'The Green' um ... it starts at eight.
Brian: Great!

- Not just the words!
- Back channel responses from Brian at 1 and 2
  - quizzical at 1
  - affirmative at 2

Back channels (ctd)

- Back channels include:
  - nods and grimaces
  - shrugs of the shoulders
  - grunts and raised eyebrows

- Utterance begins vague ...
  ... then sharpens up just enough

Back channels - media effects

Restricting media restricts back channels

video  – loss of body language
audio  – loss of facial expression
half duplex – lose most voice back-channel responses
text based – nothing left!
Back channels and turn-taking

in a meeting...
- speaker offers the floor
  (fraction of a second gap)
- listener requests the floor
  (facial expression, small noise)

Grunts, 'um's and 'ah's, can be used by the:
- listener to claim the floor
- speaker to hold the floor
... but often too quiet for half-duplex channels

e.g. Trans-continental conferences – special problem
- lag can exceed the turn taking gap
... leads to a monologue!

Basic conversational structure

Alison: Do you fancy that film
Brian: the uh (500 ms) with the black cat
  'The Green whatst' 
Alison: yeah, go at uh... 
  (looks at watch ~ 1.2 s) ... 20 to?
Brian: sure

Smallest unit is the utterance

Turn taking \Rightarrow utterances usually alternate ...

Adjacency pairs

Simplest structure – adjacency pair

Adjacency pairs may nest:
Brian: Do you want some gateau?
Alison: is it very fattening?
Brian: yes, very
Alison: and lots of chocolate?
Brian: masses
Alison: I'll have a big slice then.

Structure is: B-x, A-y, B-y, A-z, B-z, A-x
- inner pairs often for clarification
... but, try analysing the first transcript in detail!
Context in conversation

Utterances are highly ambiguous
We use context to disambiguate:

Brian: (points) that post is leaning a bit
Alison: that’s the one you put in

Two types of context:
- external context – reference to the environment
  e.g., Brian’s ‘that’ – the thing pointed to
- internal context – reference to previous conversation
  e.g., Alison’s ‘that’ – the last thing spoken of

Referring to things – deixis

Often contextual utterances involve indexicals:
that, this, he, she, it
these may be used for internal or external context

Also descriptive phrases may be used:
- external: ‘the corner post is leaning a bit’
- internal: ‘the post you mentioned’

In face-to-face conversation can point

Common Ground

Resolving context depends on meaning
→ participants must share meaning
so must have shared knowledge
Conversation constantly negotiates meaning
→ a process called grounding:

Alison: So, you turn right beside the river.
Brian: past the pub.
Alison: yeah

Each utterance is assumed to be:
relevant – furthers the current topic
helpful – comprehensible to listener
Focus and topic

Context resolved relative to current dialogue focus

Alison: Oh, look at your roses :)
Brian: mmm, but I've had trouble with greenfly.
Alison: they're the symbol of the English summer.
Brian: greenfly?
Alison: no roses silly!

Tracing topics is one way to analyse conversation.
- Alison begins – topic is roses
- Brian shifts topic to greenfly
- Alison misses shift in focus … breakdown

Breakdown

Breakdown happens at all levels:
- topic, indexicals, gesture

Breakdowns are frequent, but
- redundancy makes detection easy
  (Brian cannot interpret 'they’re … summer')
- people very good at repair
  (Brain and Alison quickly restore shared focus)

Electronic media may lose some redundancy
→ breakdown more severe

Speech act theory

A specific form of conversational analysis

Utterances characterised by what they do …
  e.g. 'I'm hungry'
  → propositional meaning = hunger
  → intended effect = 'get me some food'

Basic conversational act the illocutionary point:
  → promises, requests, declarations, …

Speech acts need not be spoken
  e.g. silence often interpreted as acceptance …
Patterns of acts & Coordinator

- Generic patterns of acts can be identified
- Conversation for action (CfA) regarded as central
- Basis for groupware tool Coordinator
  - structured email system
  - users must fit within CfA structure
  - not liked by users!

Conversations for action (CfA)

Circles represent ‘states’ in the conversation
Arcs represent utterances (speech acts)

CfA in action

- Simplest route 1–5:
  - Alison: have you got the market survey on chocolate mousse? request
  - Brian: sure promise
  - Brian: there you are assert
  - Alison: thanks declare

- More complex routes possible, e.g., 1–2–6–3 ...
  - Alison: have you got ... request
  - Brian: I’ve only got the summary figures counter
  - Alison: that’ll do accept
Text-based communication

Most common media for asynchronous groupware
exceptions: voice mail, answer-phones

Familiar medium, similar to paper letters
but, electronic text may act as speech substitute!

Types of electronic text:
- discrete directed messages, no structure
- linear messages added (in temporal order)
- non-linear hypertext linkages
- spatial two dimensional arrangement

In addition, linkages may exist to other artefacts

Problems with text

No facial expression or body language
→ weak back channels

So, difficult to convey:
- affective state → happy, sad, ...
- illocutionary force → urgent, important, ...

Participants compensate:
- "flaming" and smiles
  ;-)
  :-(
  :-(

example - 'Conferencer'

linear conversation area – LHS  RHS – spatial simulated pinboard
Grounding constraints

Establishing common ground depends on grounding constraints

cotemporality – instant feedthrough
simultaneity – speaking together
sequence – utterances ordered

Often weaker in text based communication
e.g., loss of sequence in linear text

loss of sequence

Network delays or coarse granularity → overlap

1. Bethan: how many should be in the group?
2. Rowena: maybe this could be one of the 4 strongest reasons
3. Rowena: please clarify what you mean
4. Bethan: I agree
5. Rowena: hang on
6. Rowena: Bethan what did you mean?

Message pairs 1&2 and 3&4 composed simultaneously
– lack of common experience
   Rowena: 2 1 3 4 5 6
   Bethan: 1 2 4 3 5 6

N.B. breakdown of turn-taking due to poor back channels
Maintaining context

Recall context was essential for disambiguation
Text loses external context, hence deixis
(but, linking to shared objects can help)

1. Alison: Brian’s got some lovely roses
2. Brian: I’m afraid they’re covered in greenfly
3. Clarise: I’ve seen them, they’re beautiful

Both (2) and (3) respond to (1)
... but transcript suggests greenfly are beautiful!

Non-linear conversation

1. Alison: Brian’s got some lovely roses
2. Brian: I’m afraid they’re covered in greenfly
3. Clarise: I’ve seen them they’re beautiful
4. Clarise: have you tried companion planting?

Pace and granularity

Pace of conversation – the rate of turn taking
- face-to-face – every few seconds
- telephone – half a minute
- email – hours or days

Face-to-face conversation is highly interactive
- initial utterance is vague
- feedback gives cues for comprehension

lower pace ⇒ less feedback
⇒ less interactive
Coping strategies

People are very clever! they create coping strategies when things are difficult

Coping strategies for slow communication attempt to increase granularity:

- eagerness – looking ahead in the conversation game
  - Brian: Like a cup of tea? Milk or lemon?
- multiplexing – several topics in one utterance
  - Alison: No thanks. I love your roses.

The Conversation Game

Conversation is like a game
Linear text follows one path through it
Participants choose the path by their utterances
Hypertext can follow several paths at once

... like a game
participants choose the path by their utterances
Group dynamics

Work groups constantly change:
- in structure
- in size
Several groupware systems have explicit rôles
  - But rôles depend on context and time
  - e.g., M.D. down mine under authority of foreman
  - and may not reflect duties
  - e.g., subject of biography, author, but now writer
Social structure may change: democratic, autocratic, ...
  and group may fragment into sub-groups
Groups also change in composition
  → new members must be able to ‘catch up’

Physical environment

Face-to-face working radically affected by layout of workplace

  e.g. meeting rooms:
  - recessed terminals reduce visual impact
  - inward facing to encourage eye contact
  - different power positions
Distributed cognition

Traditional cognitive psychology in the head

Distributed cognition suggests look to the world

Thinking takes place in interaction
  - with other people
  - with the physical environment

Implications for group work:
  - importance of mediating representations
  - group knowledge greater than sum of parts
  - design focus on external representation