Calm Computing
The Coming Age of Calm Computing

Mark Weiser and John Seely Brown
Whyfor, Calm Computing?
Whyfor, Calm Computing?
Whyfor, Calm Computing?

Computer Evolution

Mainframes
Whyfor, Calm Computing?

Computer Evolution

Mainframes

PCs
Whyfor, Calm Computing?

Computer Evolution

Mainframes

PCs

Internet
Whyfor, Calm Computing?
Whyfor, Calm Computing?

Computer Evolution

- Mainframes
- PCs
- Internet
- Mobile
- Ubicomp
What IS Calm Computing?
What IS Calm Computing?

Attention has two places:
What IS Calm Computing?

Attention has two places:

Center
What IS Calm Computing?

Attention has two places:

Center

Periphery
What IS Calm Computing?

Attention has two places:

Center
Periphery
What IS Calm Computing?

Attention has two places:

Center

Periphery

Calm computing moves between center and periphery
What IS Calm Computing?

Attention has two places:

Center
Periphery

Calm computing moves between center and periphery
What IS Calm Computing?

Attention has two places:

Center
Periphery

Calm computing moves between center and periphery

Calm because
What IS Calm Computing?

Attention has two places:

Center

Periphery

Calm computing moves between center and periphery

Calm because

Periphery informs without overwhelming
What IS Calm Computing?

Attention has two places:

- Center
- Periphery

Calm computing moves between center and periphery

Calm because

- Periphery informs without overwhelming
- You can move to the center to get control
When is something a Calm Technology?
When is something a Calm Technology?

When it empowers our periphery:
When is something a Calm Technology?

When it empowers our periphery:

Easily moves from center to periphery
When is something a Calm Technology?

When it empowers our periphery:

Easily moves from center to periphery
Throbbing Apple light
When is something a Calm Technology?

When it empowers our periphery:

- Easily moves from center to periphery
- Throbbing Apple light
- My printer turns itself off
When is something a Calm Technology?

When it empowers our periphery:

Easily moves from center to periphery
Throbbing Apple light
My printer turns itself off

Brings more details into periphery
When is something a Calm Technology?

When it empowers our periphery:

- Easily moves from center to periphery
- Throbbing Apple light
- My printer turns itself off

- Brings more details into periphery
- Teleconferencing
When is something a Calm Technology?

When it empowers our periphery:

- Easily moves from center to periphery
- Throbbing Apple light
- My printer turns itself off

- Brings more details into periphery
- Teleconferencing
- Other examples?
Example 1
Example 1

Office door window
Example 1

Office door window

Looking out to context
Example 1

Office door window

Looking out to context

Looking in at occupant
Example 1

Office door window

Looking out to context

Looking in at occupant

Privacy preserved
Example 2
Example 2

Dangling string
Example 2

Dangling string

Provides network activity information
Example 2

Dangling string

Provides network activity information

Brings invisible info into periphery
Example 2

Dangling string

- Provides network activity information
- Brings invisible info into periphery

BUT
Example 2

Dangling string

Provides network activity information

Brings invisible info into periphery

BUT

Does it stay in our periphery?
Thought questions?
Thought questions?

What’s missing in this model?
Thought questions?

What’s missing in this model?

Is calm a defining feature of Ubicomp?
Thought questions?

What’s missing in this model?

Is calm a defining feature of Ubicomp?
What does it mean to be invisible?
Method
Method

Home is different from the office
Method

Home is different from the office

Ethnomethodologically-informed ethnography
Method

Home is different from the office

Ethnomethodologically-informed ethnography

“focuses on the ways in which people make sense of their world, display this understanding to others, and produce the mutually shared social order in which they live.”
Method

Home is different from the office

Ethnomethodologically-informed ethnography

“focuses on the ways in which people make sense of their world, display this understanding to others, and produce the mutually shared social order in which they live.”

Basically...
Method

Home is different from the office

Ethnomethodologically-informed ethnography

“focuses on the ways in which people make sense of their world, display this understanding to others, and produce the mutually shared social order in which they live.”

Basically...

Live in people’s houses
Method

Home is different from the office

Ethnomethodologically-informed ethnography

“focuses on the ways in which people make sense of their world, display this understanding to others, and produce the mutually shared social order in which they live.”

Basically...

Live in people’s houses

Think carefully about what stuff means
Method

Home is different from the office

Ethnomethodologically-informed ethnography

“focuses on the ways in which people make sense of their world, display this understanding to others, and produce the mutually shared social order in which they live.”

Basically...

Live in people’s houses

Think carefully about what stuff means

GOAL: Understand home environment
Method

Home is different from the office

Ethnomethodologically-informed ethnography

“focuses on the ways in which people make sense of their world, display this understanding to others, and produce the mutually shared social order in which they live.”

Basically...

Live in people’s houses

Think carefully about what stuff means

GOAL: Understand home environment

Then: Examine the importance of routines
Method

Home is different from the office

Ethnomethodologically-informed ethnography

“focuses on the ways in which people make sense of their world, display this understanding to others, and produce the mutually shared social order in which they live.”

Basically...

Live in people’s houses

Think carefully about what stuff means

GOAL: Understand home environment

Then: Examine the importance of routines

Lucy Suchman
Method

Home is different from the office

Ethnomethodologically-informed ethnography

“focuses on the ways in which people make sense of their world, display this understanding to others, and produce the mutually shared social order in which they live.”

Basically...

Live in people’s houses

Think carefully about what stuff means

GOAL: Understand home environment

Then: Examine the importance of routines

Lucy Suchman

Anthropologist
Scenario 1
Scenario 1

Christine and Louise are next door neighbors. Both mums with school kids.
Scenario 1

Christine and Louise are next door neighbors. Both mums with school kids.

A routine evolved.
Scenario 1

Christine and Louise are next door neighbors. Both mums with school kids.

A routine evolved.

Knocking is a message
Scenario 1

Christine and Louise are next door neighbors. Both mums with school kids.

A routine evolved.

Knocking is a message

Opening the door is a message
Scenario 1

Christine and Louise are next door neighbors. Both mums with school kids.

A routine evolved.

Knocking is a message

Opening the door is a message

The door is a resource for coordination
Scenario 1

Christine and Louise are next door neighbors. Both mums with school kids.

A routine evolved.

Knocking is a message

Opening the door is a message

The door is a resource for coordination
Scenario 1

Christine and Louise are next door neighbors. Both mums with school kids.

A routine evolved.

Knocking is a message

Opening the door is a message

The door is a resource for coordination
Scenario 1 (con’t)
Scenario 1 (con’t)

Lessons learned:
Scenario 1 (con’t)

Lessons learned:

Some activities have meanings that are used to coordinate routines
Scenario 1 (con’t)

Lessons learned:

Some activities have meanings that are used to coordinate routines

Meanings are very specific to the participants in a specific time and place (context-specific)
Scenario 1 (con’t)

Lessons learned:

Some activities have meanings that are used to coordinate routines.

Meanings are very specific to the participants in a specific time and place (context-specific).

Shared understanding exists so participants don’t have to explain anything.
Scenario 1 (con’t)

Lessons learned:

Some activities have meanings that are used to coordinate routines

Meanings are very specific to the participants in a specific time and place (context-specific)

Shared understanding exists so participants don’t have to explain anything.

Comments?
Scenario 1 (con’t)

Lessons learned:

Some activities have meanings that are used to coordinate routines

Meanings are very specific to the participants in a specific time and place (context-specific)

Shared understanding exists so participants don’t have to explain anything.

Comments?
Scenario 2
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was

Not unusual
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was

- Not unusual
- Notable
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was

- Not unusual
- Notable
- Unremarkable (literally she made no remark about it)
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was

- Not unusual
- Notable
- Unremarkable (literally she made no remark about it)
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was

- Not unusual
- Notable
- Unremarkable (literally she made no remark about it)

So did this whole idea come from a woman ignoring an alarm clock?
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was

- Not unusual
- Notable
- Unremarkable (literally she made no remark about it)

So did this whole idea come from a woman ignoring an alarm clock?

Are these valid conclusions?
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was

Not unusual

Notable

Unremarkable (literally she made no remark about it)

So did this whole idea come from a woman ignoring an alarm clock?

Are these valid conclusions?

What if she was irritated or felt rushed? (“Oh shite, gotta wake the bloody urchins”)
Scenario 2

Mom works in morning, hears alarm clock, doesn’t comment about it, and then tells her kids to wake up.

Alarm was

   Not unusual

   Notable

   Unremarkable (literally she made no remark about it)

So did this whole idea come from a woman ignoring an alarm clock?

Are these valid conclusions?

What if she was irritated or felt rushed? (“Oh shite, gotta wake the bloody urchins”)

How can you design if reactions are unpredictable?
Implications for Ubicomp
Implications for Ubicomp

How to design something “so embedded, so fitting, so natural”
Implications for Ubicomp

How to design something “so embedded, so fitting, so natural”

Invisibility: perceptual invisibility or “invisibility in use”
Implications for Ubicomp

How to design something “so embedded, so fitting, so natural”

Invisibility: perceptual invisibility or “invisibility in use”

Fit into the routine or action
Implications for Ubicomp

How to design something “so embedded, so fitting, so natural”

Invisibility: perceptual invisibility or “invisibility in use”

Fit into the routine or action

Don’t do it for the user, let them feel like they did it themselves
Implications for Ubicomp

How to design something “so embedded, so fitting, so natural”

Invisibility: perceptual invisibility or “invisibility in use”

Fit into the routine or action

Don’t do it for the user, let them feel like they did it themselves

Augment the action not the artifact (necessarily)
More implications
More implications

Support routines
More implications

Support routines

BUT... it’s context sensitive and SOCIALLY CONSTRUCTED
More implications

Support routines
   BUT... it’s context sensitive and SOCIALLY CONSTRUCTED

Questions
More implications

Support routines
  BUT... it’s context sensitive and SOCIALLY CONSTRUCTED

Questions
  Is this AI-complete? (Awww, Crap)
More implications

Support routines
   BUT... it’s context sensitive and SOCIALLY CONSTRUCTED

Questions
   Is this AI-complete? (Awww, Crap)

   Can end-user programming save the day? (or just ruin it)
More implications

Support routines
   BUT... it’s context sensitive and SOCIALLY CONSTRUCTED

Questions
   Is this AI-complete? (Awww, Crap)

   Can end-user programming save the day? (or just ruin it)

   Is there a real activity here that needs supported? (the scenario people seem happy without ubicomp)
More implications

Support routines
   BUT... it’s context sensitive and SOCIALLY CONSTRUCTED

Questions
   Is this AI-complete? (Awww, Crap)

   Can end-user programming save the day? (or just ruin it)

   Is there a real activity here that needs supported? (the scenario people seem happy without ubicomp)

   Maybe we shouldn’t look at normal, boring people. (How about some Fruit Loops?)