### Beyond Seamless Integration Seamful Ubiquity

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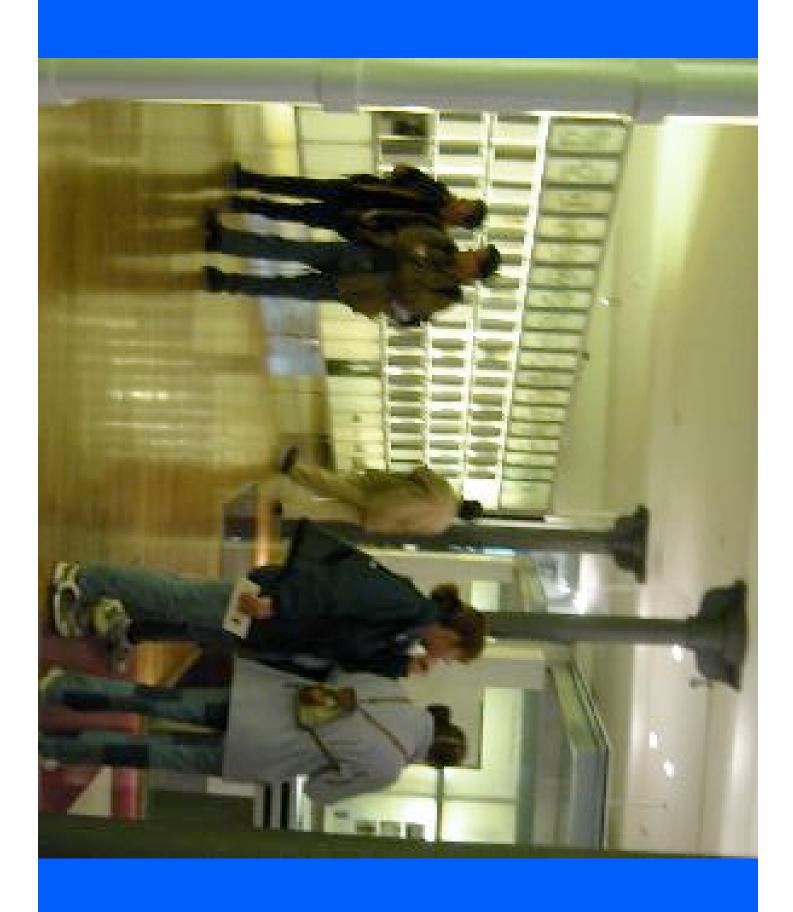
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# Weiser and 'Seamfulness'

- A good tool: focus on the task not the tool
- Often taken as meaning seamless technology
- All places the same, all tech tools hidden
- Instead: 'seamful' technologies
- Tool is apparent but with "beautiful seams"
- Can use or adapt the tool when one wants to
- e.g. showing mobile phone cells & strengths

### The 'City' Project

- Three visitors to an exhibition room
- One using a wearable/handheld computer
- One using 3D VR and textual web pages
- One using 2D map and textual web pages
- Each visitor gets location-specific content
- Mutual awareness of location in room
- Activity in each medium represented in others
- Also shared audio connection and shared exhibition text
- First system built and deployed
- Recently finished user trials in Glasgow





#### Uncertainty

- Handheld has position tracked via ultrasound
- 95% accuracy of 1.83m
- Sensors always have some uncertainty Ultrasound, GPS...
- Can't always make things 'perfect' and seamless
- Instead: positive choice to reveal and use uncertainty
- e.g. system shows sensed position as a spatial extent
- e.g. people using inaccuracy as a tool for privacy

## Design for Appropriation

- Systems built to support users' adaptation
- Let users appropriate it for their own new uses
- Design requirement: seamfulness
- Underlying models visible to users
- Processes that change the models visible to users
- Control and feedback of models
- A good tool lets you focus on the task
- ...even when the task involves the tool itself

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