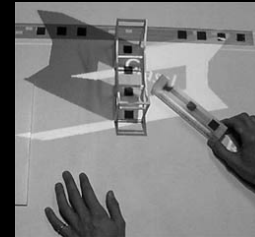
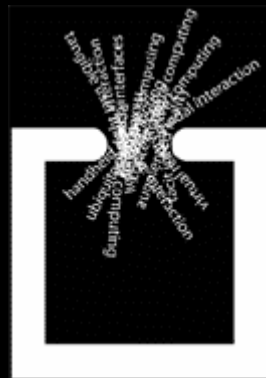


Discussing Reality-Based Interaction: A Framework for Post-WIMP Interfaces

[Jacob et al. 2008]



Interaction styles

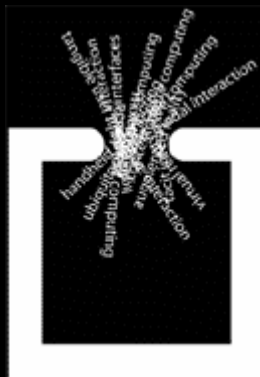


Command line



WIMP: window, icon, menu, pointing device

- direct manipulation interaction



Post-WIMP:

- virtual, mixed and augmented reality
- tangible interaction
- ubiquitous and pervasive computing
- context-aware computing
- handheld or mobile interaction
- perceptual and affective computing
- lightweight, tacit or passive interaction

RBI Themes



Naïve Physics:

common sense knowledge about the physical world:
gravity, friction, velocity, the persistence of objects, relative scale



Body Awareness & Skills:

awareness of own physical bodies; skills to coordinate movements of their limbs, head, eyes etc.
input techniques: twohanded interaction and whole-body interaction



Environment Awareness & Skills:

sense of their surroundings (reference objects and artificial landmarks for size and distance estimations); skills for navigating within and manipulating their environment: grasping, picking up, positioning, altering, and arranging objects



Social Awareness & Skills:

awareness of others in their environment; skills for social interaction:
verbal and non-verbal communication, collaboration, avatars

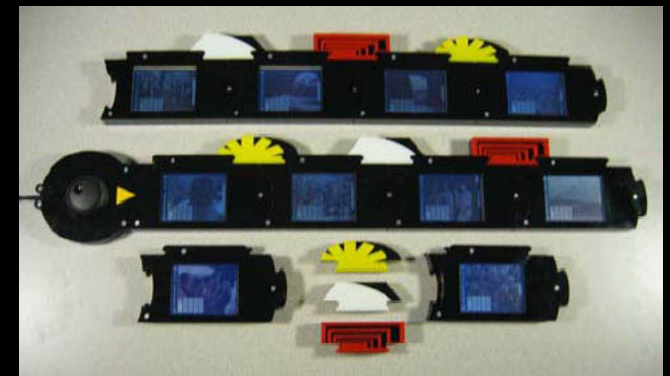
Implications for design

- RBI may reduce the mental effort required to operate a system because users already possess the skills needed
 - easier learning
 - better performance in situations involving information overload, time pressure, or stress because of reduction of overhead effort
 - encouraging improvisation and exploration because users do not need to learn interface-specific skills
- a useful interface will rarely entirely mimic the real world, but will necessarily include some unrealistic or artificial features and commands
- designers must strike a balance between the power of their interface and its level of reality

Tradeoffs

(Tangible Video Editor)

- Reality vs. Expressive Power
 - functionality often seen as most important, but more features do not always result in a better system
- Reality vs. Efficiency
 - sometimes it is preferable to use skills that are as easy as walking rather than privileging efficiency
- Reality vs. Versatility
 - single task
- Reality vs. Ergonomics
 - interfaces may cause repetitive stress injuries and fatigue
- Reality vs. Accessibility
 - realistic actions may not be ideal for the disabled
- Reality vs. Practicality
 - cost, technological limitations, space, size, durability, power consumption, environmental impact

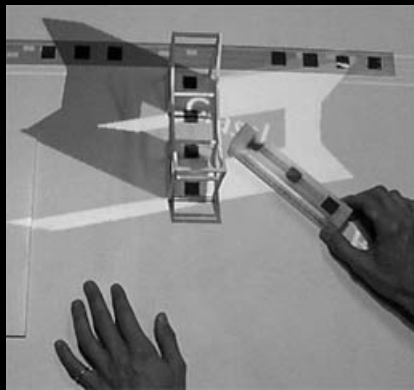
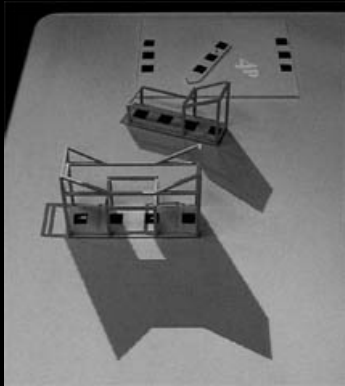


Summary

- for realistic actions using real world commands (walking, moving his head, and looking around)
- additional functions for which there is no analogy in humans (flying and Xray vision) for performing tasks in a more efficient way
- in RBI design we can ask that non real world commands be analogous to some realistic counterpart (e.g. users' eye movements as the command for X-ray vision)
- designer's goal should be to allow the user to perform realistic tasks realistically, to provide additional non real-world functionality, and to use analogies for these commands whenever possible
- conventional walking gesture to walk—unless using a less natural command would provide extra power (e.g. speed, automatic route finding)
- designers should not give up realistic commands lightly, not without gaining some added efficiency



Case Study 1: Urp Urban Planning



- TUI that allows users to place models of buildings on an interactive surface collaboratively; overlaying digital information onto the surface such as shadows, the pattern of wind, and glare
- RBI themes
 - basic interaction techniques (add, remove, and position models) build directly on users' knowledge of NP and EAS
 - secondary interaction technique: inspecting the urban model from different POVs: difficult with GUIs; with RBI the user simply moves his or her body (BAS, EAS)
 - no need to share a single input device or crowd around a computer screen—social interaction skills (SAS)
- Tradeoffs
 - reality vs. expressive power: to change a building's material touch the model with a special material wand
 - reality vs. practicality, expressive power: impossible to change the shape of a building or to add a new building

Case Study 2: Apple iPhone

- RBI themes
 - NP: multitouch sensing; landscape or portrait view; springiness (acts as if a list had a mass)
 - EAS: spacial relationship between objects (go to next image)
 - BAS: shuts off the screen to prevent accidental button presses when close to the face
- Tradeoffs
 - versatitly over reality: no real keyboard (larger screen, but no haptic feedback)
 - reality over efficiency: feature just to type the first few letters of a contact's name missing
 - reality over accessability: webpages displayed in full form rather than in column view

Case Study 3: Electronic Tourist Guide

- displays pictures of buildings surrounding the user on a hand-held device
- RBI themes:
 - location (EAS) and orientation (BAS) aware
 - user has an innate knowledge of how to input location: just go there
- Tradeoffs:
 - reality vs. expressive power: location specified via GPS or button presses—latter mode can lead to previewing an area

Case Study 4: Visual-Cliff Virtual Environment



- RBI Themes
 - NP, EAS: pick up objects and place them in new locations
 - BAS
- Tradeoffs
 - reality over efficiency: methods for locomotion: hand gestures, leaning in the direction of movement; walking in place; real walking
 - realistic interaction worked better in the virtual environment than interaction commands that must be learned
 - reality vs. practicality tradeoff: walking in place system necessary if space is constrained

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