The Design of Interactive Computational Media

Class 8: 30 Oct. 2002

Prototyping

Outline

- Definitions
- Uses in the design process
- Approaches
- "Technologies"
- Examples
- Lessons from a practitioner (Agnes Ouellette)

Definitions

- Prototype (Webster's Third New International Dictionary)
  - "1a(1): an original on which a thing is modeled... b: an individual that exhibits the essential features of a later individual or species... c: an individual, quality, or complex that exemplifies or serves as a standard of the essential features of a group or type..."
- Prototypes should exhibit, exemplify, and make vivid and comprehensible the essential features of the system that is being designed, and of its style of user interface, i.e., its look and feel.
- Prototypes should suggest what the application will do, what its essential characteristics are, what it will look like, and how it is to be used.

Prototypes are Used for Envisionment

- Prototypes are used to help one visualize things that that do not yet exist
- Prototypes are used for
  - Designing media, systems, and interfaces
  - Pre-testing media, systems, and interfaces
  - Presenting interface ideas

Envisionment in Design

- Visualizing concepts
- Exploring alternatives
- Resolving feature details
- Developing interaction scenarios (e.g., "Day in the Life" scenarios)

Envisionment in Pre-testing

- Can you read or interpret this? Can you follow this?
- Can you make this work?
- Do you understand what is going on?
- Is this the way you would do this?
- Does this suggest alternate approaches to you?

Envisionment for Presentation and Discussion

- To interface designers, for discussion
- To programmers, to guide implementation
- To marketing and management, to guide product design and marketing decisions
- To users, to get early feedback

Fidelity of Prototypes

- "High fidelity" versus "low fidelity" prototypes
- Degree of fidelity
  - Increasing functionality
  - Greater set of allowable inputs
  - More realism in interaction style
  - Greater detail in visual appearance

1D Envisionment Media and Tools

- Scripts, scenarios... e.g., "A Day in the Life"
- Role-playing exercises
- Wizard of Oz simulations

2D Envisionment Media and Tools

- Drawings, sketches
- Screen shots
- Storyboards
- Flipbooks
- Collections of post-its and cut-outs
- Paper or cardboard mockups

3D Envisionment Media and Tools

- Puppets
- Physical models
- Computer animation
- Videos
- Interactive software "rapid prototypes"

Interactive Software Prototyping Tools

- HyperCard
- Director and Flash
- Visual Basic
- Web-based prototyping, e.g., with Dreamweaver

Hypercard

- A system accessible to non-programmers
- An interface builder
- A direct manipulation system
- A hypertext system
- A prototyping tool
- An extensible system
- An object-oriented system
- Prototype construction in HyperCard
  - Design the screens, which tend to look like cards, interactively
  - Design the interaction, which is activated when people point at certain objects such as menus, press or release mouse button, or move cursor into certain regions, by writing scripts in an English-like programming language called HyperTalk

Hypercard

- Some interface limitations to HyperCard
  - Best for card-based interfaces
  - Not good for interactive text manipulation
  - Not good for sketching, gesture-based interfaces
- Some HyperTalk language limitations
  - No arrays
  - Little (weird) program structure
  - Few debugging tools

Director

- Features of Director
  - System for computer animation, structuring images and their changes over time
  - One central timeline
  - Theatre as the unifying metaphor — actors, stage, etc.
  - Easily accessible to non-programmers
  - Scripting language — Lingo
  - An extensible, object-oriented system
- Limitations to Director
  - Lingo language not easily accessible to non-prorammers
  - Need two versions for cross-platform work on PC and Mac

Flash compared to Director

- Significantly cheaper than Director
- Less powerful than Director
  - No 3D modelling and animation
  - Less access to hardware resources
  - No XML
- Multiple timelines, for individual scenes and sprites
- Scripting language — Actionscript
- Actionscript easily accessible to non-programmers

Visual Basic

- Features of Visual Basic
  - Interactive definition of screens and how they relate through interaction
  - Defintion of functionality and logic of interaction in the Basic programming language
  - More expressive & powerful language than HyperTalk, Lingo, or Actionscript
- Limitations to Visual Basic
  - Not as accessible to non-programmers
  - Language gets very hairy very quickly

Web-based Prototyping

- Ensembles of tools
  - HTML for defining Web pages (static and interactive)
  - Image maps for representing graphics (that are interactive)
  - JavaScript for defining logic of interaction
  - Java applets for defining functionality
- Dreamweaver
  - Direct manipulation system that insulates interface designer from much of this detail
  - See document by Wigdor

Example — Knowledge Navigator video

- High fidelity in terms of image quality and slickness
- Low fidelity in terms of functionality and interactivity

QuickTime™ and a Sorenson Video decompressor are needed to see this picture.

Questions and Discussion

Lessons from a Practitioner (Agnes Ouellette)

- Day in a life scenario
  - Telling a story, or putting on a play.
  - Story can be told VISUALLY
  - Story can be told VERBALLY
  - You will need PROPS
- It's all in the details
  - You need to capture the CHARACTERISTICS of your system or device.
  - Strike a balance. Choose the appropriate level of detail to illustrate your IDEA to the user.
  - Pick out only the important details and concentrate on executing those well. **level of detail : amount of information**

Practical prototyping…

- Remain flexible
  - Remember that your first prototype will not be your last. If your design is to progress, you must be willing to iterate the idea over and over again. Do not spend too much time on your first few prototypes.
- Materials
  - Choose materials that are easy to manipulate, ones you feel comfortable using.
  - Make something that is pleasant to look at and hold.
  - Allow for strength, create prototypes that can handle a lot of use. Reject ideas that are too fragile and complicated, whenever possible simplify.
- Learn from examples…

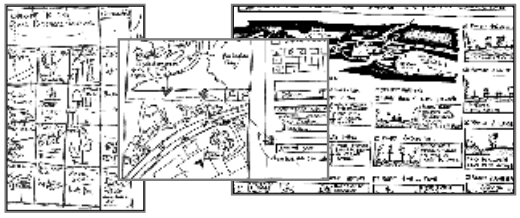
Day in a life example

- Memory prosthesis
  - Created using digital video editing tools, photoshop, and hand drawings.
  - A detailed story about how a device is used on a daily basis.
  - User experience is highly detailed, while physical prototypes are left as sketches.

QuickTime™ and a Animation decompressor are needed to see this picture.

Interface prototype example (rough)

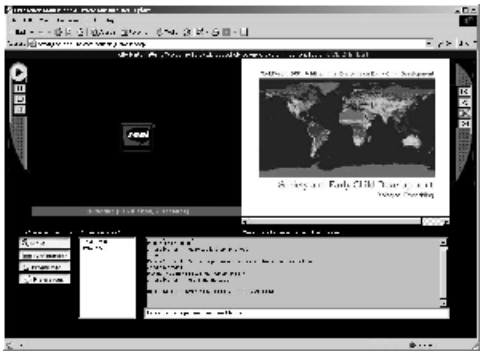
- Landquest navigational / collaboration device
  - Created using pen, paper scotch tape, and photocopier.
  - Preliminary interface designs, working through screen space allocation, tools, input/output devices.



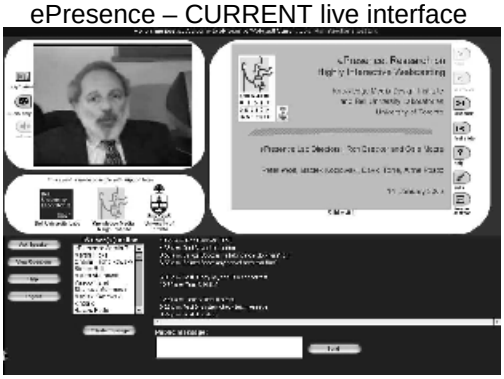
Interface prototype example (refined)

- ePresence
  - Created using photoshop, implemented with HTML.
  - Webcasting and digital collaboration tools.
  - Multiple user interface iteration cycle, based on extensive user feedback and detailed design review.

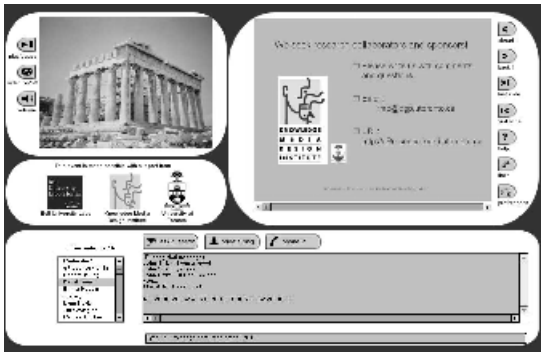
ePresence – OLD live interface



ePresence – CURRENT live interface



ePresence – PROPOSED live interface



Physical prototype example

- Heads up display
  - Created with pen, paper, photocopier, scotch tape, acetate and car.
  - Physical but static heads up display, most likely to be paired with interactive software prototype.

QuickTime™ and a Sorenson Video decompressor are needed to see this picture.

Questions and Discussion

Break

Discussion of Prototyping for Projects

- What type of prototype will you need?
  - Physical
  - Software prototype
  - Day in a life
- What type of materials will you need?
  - Type of software tools
  - Physical materials (cardboard, paper, glue)
- Who should work on what elements of prototype?
  - Match skills appropriately
  - Enjoy the work