Designing for Multimedia

DEMMS4
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Outline

- What's Special about Multimedia Design?
- A Design Method
  - Based on the City Design Method
  - Developed by Alistair Sutcliffe and Stephanie Wilson
- Evaluation
- Authoring Tools

What's Special About Multimedia Design?

- Rich forms of
  - information delivery
  - interaction
- Challenges of
  - perception
  - comprehension
  - integration & attention

The City Design Method

- Developed by Alistair Sutcliffe (Director, Centre for Human Computer Interaction Design, UMIST) and Stephanie Wilson (Centre for HCI Design, City University)
- Focuses on information presentation
- Provides a sequence of activities, linked to semi-formal specification techniques

First (Some) Basic Principles

- remove obstacles
- minimise effort
- give feedback
- be explicit
- be flexible
- constrain away errors, otherwise be forgiving

ISO 14915 Part 3

- Support user tasks
- Support communication goals
- Ensure compatibility with users' understanding
- Select media appropriate for the users' characteristics
- Support user preferences
- Consider the context of use
- Use redundancy for critical information
- Avoid semantic conflicts
- Avoid conflicting perceptual channels
- Combine media for different viewpoints
- Avoid information overload
- Choose media combinations to elaborate information
- Design for simplicity
- Guard against degradation
- Preview media selections
- Use static media for important messages

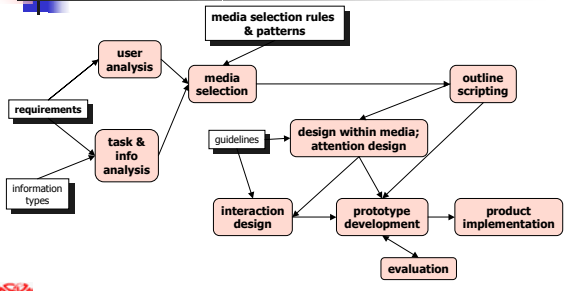
City Method Design Guidelines

- thematic congruence
- manageable information load
- viewpoints
- reinforcement
- appropriate media selection
- avoid attention conflicts

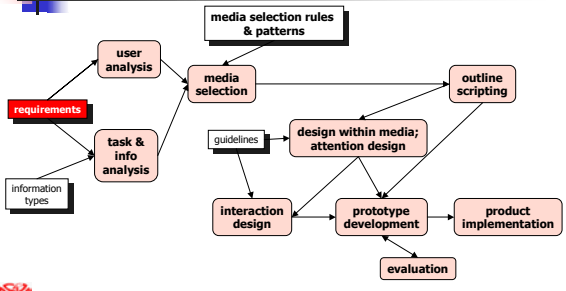
Design Process Overview

- Information design
  outcome example: high-level script, task tree, structure diagram and/or state transition diagram, information structure diagram
- Interaction design
  outcome example: storyboard
- Media design
  outcome examples: selection of media for information components ; media-specific designs (scripts, images, etc)
- Presentation design
  outcome examples: sketches, prototype

The City Design Method: Requirements



The City Design Method: Requirements



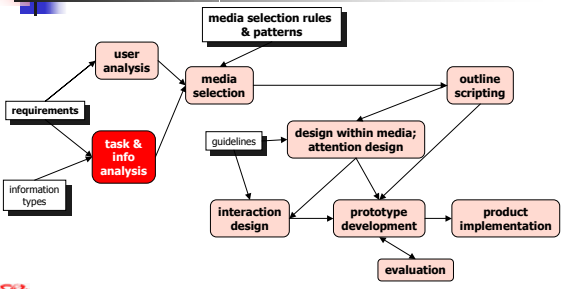
Requirements

- What do you want this product to accomplish?
  - your goals
- Who do you need to reach, how can you reach them, and what do they want?
  - implies choice: high end vs low end PC; WWW vs CD-ROM
- What content do you have the time/money/resources to create or obtain?
  - Much video and sounds will need to be recorded, photos taken, graphics drawn, prose written. Is any available?

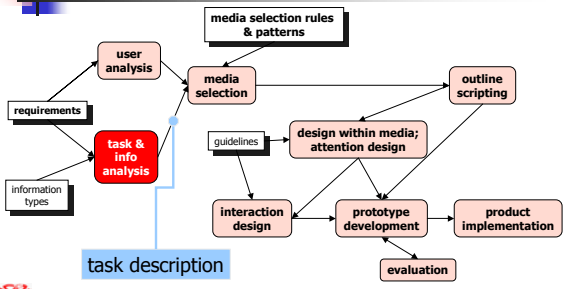
Requirements

- What technologies will you use to create and deliver the content?
  - Authoring tool, on-line publishing, electronic document, presentation software, programming language…

The City Design Method: Task & Information Analysis



The City Design Method: Task Analysis



Task Description

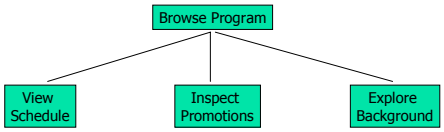
- Lots of choices
  - task trees
    - GOMS
    - TKS
    - ConcurTaskTrees
  - task tables (UAN and XUAN)
  - state transition diagrams (including Petri Nets)
  - timeline-based representation (Dexter Model)
- we'll use ConcurTaskTrees
- will discuss the other choices later

ConcurTaskTrees

- hierarchic task modelling notation
- graphical
- good at expressing temporal properties of complex tasks
- shows dynamic relationships of media and interaction

ConcurTaskTrees Example

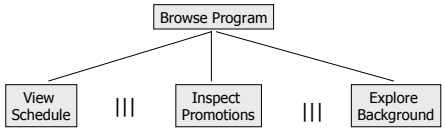
with partial temporal relationships



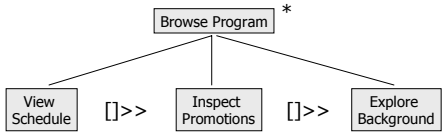
ConcurTaskTree temporal operators

T [] T2	choice
T1 >> T2	enabling
T1 ||| T2	interleaving
T1 |[]| T2	synchronization
T1 []>> T2	enabling with info passing
T1 [> T2	deactivation
T*	iteration
T(n)	finite iteration
[T]	optional task

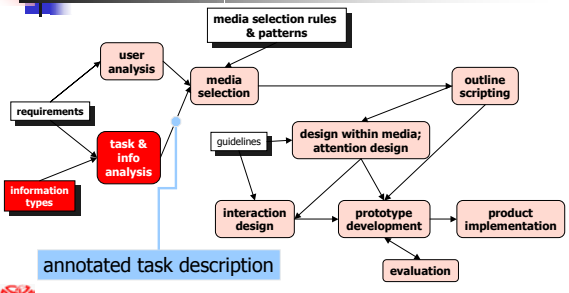
ConcurTaskTrees Example 1



ConcurTaskTrees Example 2



The City Design Method: Information Analysis



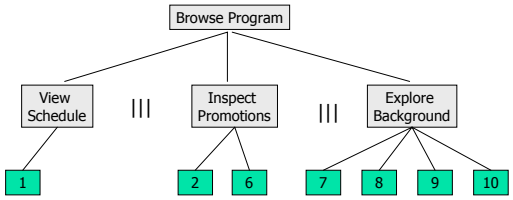
Information Design

- identify information needs from task model
- group information content
- identify key information items
- determine information type
- annotate onto task model/ content structure diagram

3 D Model of Information Types

- conceptual vs physical
- static vs dynamic
- descriptions, events, actions, procedures, states, values, spatial information

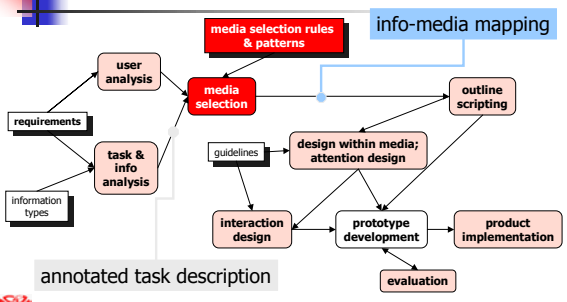
ConcurTaskTrees Example 1



The City Design Method: Information categorisation

ID	Information Group	Information Type
1	Play schedule	Descriptive, conceptual
2	Players	Descriptive, conceptual & physical
3	Seating plan	Spatial, descriptive, physical
4	Seat prices	Descriptive, conceptual, values
5	Seat reservation	Descriptive, conceptual, event, time
6	Play content (theme, synopsis)	Descriptive, conceptual
7	Actors' biography	Descriptive, conceptual & physical
8	Director's biography	Descriptive, conceptual & physical
9	Company details	Descriptive, conceptual
10	Theatre location & facilities	Spatial descriptive, physical

The City Design Method: Media Selection



Media Design: Mapping Information to Media

- Associate information with media using guidelines, keeping in mind
  - User tasks and communication goals
  - User characteristics and preferences
  - Context of use
- There is no deterministic mapping from task, user, context, information type to media

The City Design Method: Media Selection

ID	Information Group	Media Type
1	Play schedule	Diagram (chart), text
2	Players	Text, Image (photographs)
3	Seating plan	diagram
4	Seat prices	Text, table
5	Seat reservation	Text, list, diagram (link to 3)
6	Play content (theme, synopsis)	Text, speech, image, moving images
7	Actors' biography	Image (photos), speech/text
8	Director's biography	Image (photos), speech/text
9	Company details	Text, image
10	Theatre location & facilities	Photos, diagram, text caption

Media Patterns

- How to Do It
  - text to explain the goal
  - procedure steps via speech & still image
  - animations to reinforce & integrate actions
  - text bullet points to summarise

Media Patterns

- Causal Explanation
  - text to introduce domain
  - text to introduce main objects, illustrated with diagram
  - cause-effect sequence via diagrams and speech
  - animation to reinforce sequence
  - diagram and text captions to summarise

Problems of Time-Varying Media

- conversational model and flexibility
- context determines interpretation
- granularity
- composition and complexity
- attention-grabbing nature of media
- control affordances:
  - we know what a button looks like, but what can be clicked in a movie, QuickTime VR image, sound?

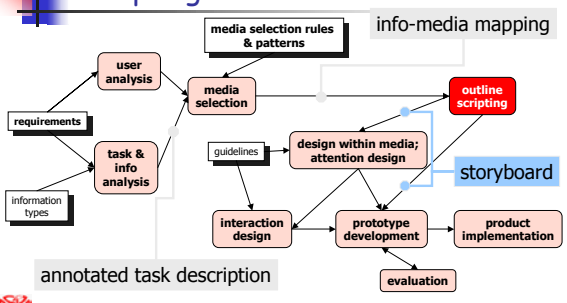
Choosing Video?

- usually short, high-impact
  - bandwidth
  - display size
    - e.g., MPEG1 is only designed for 1/4 standard screen
- user
  - expectations are high
  - familiar with limited control
    - semi-interactive
  - one user vs many
- special requirements
  - kiosk use needs large display area

Making a Video

- divide image in thirds - these are potential focus points
- avoid over-rapid change, e.g, combined panning and zooming
- for faces
  - give space for face to look into
  - use close-up to convey importance

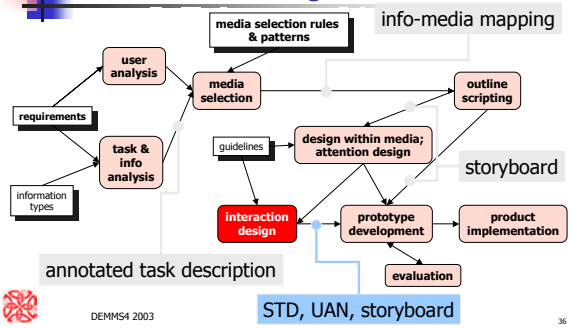
The City Design Method: Scripting



Scripting

- Sequential vs Concurrent Presentation
- Segmentation
- Storyboards
  - series of images of what the screens will look like
  - only key screens and sample sections need be drawn
  - similar to and inspired by storyboards in movie industry

The City Design Method: Interaction Design



Interaction Design

- How much interaction is suitable for your goals?
- How will users be guided through the system?
- What controls will the user have?

Interaction Design: Control

- pace
  - click when you're ready to advance
  - set presentation speed for dynamic media
- sequence
  - choose what you want to watch
- media
  - start/stop videos; search text; scroll/zoom
- parameterised configuration
  - change the outcome of a chart; customise a variable

Interaction Design: Control

- transaction
  - enter a password; pay a bill; send a message
- objects
  - move things around; other game actions
- simulation
  - change view, orientation, speed

Orientation and Navigation

- browser style
- video style
- content-based
  - thumbnails
- navigation markers
  - bookmarks, history, maps
- active controls
  - guided tours, active links

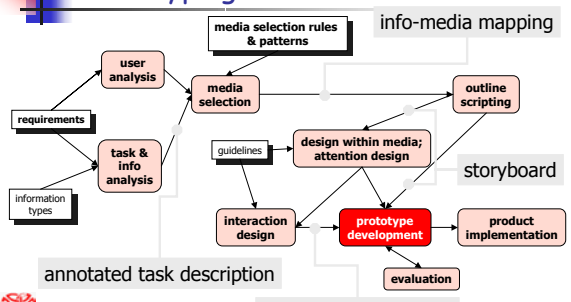
Levels of User Support

level	interaction events	example	system view
pragmatic	tasks	finding out about a topic	user session
semantic	ways of doing	going on a library tour	set of traversals
syntactic	combinations of actions	selecting a book and "opening" it	displayed node
lexical	single action	pointing at a picture	input/ output token recognised

Presentation Design

- sequential presentation: layout of pages or timeline
  - choose devices for directing attention to key points
- must balance *good looking* and *easy to use*
- "reduce ink" (Tufte)

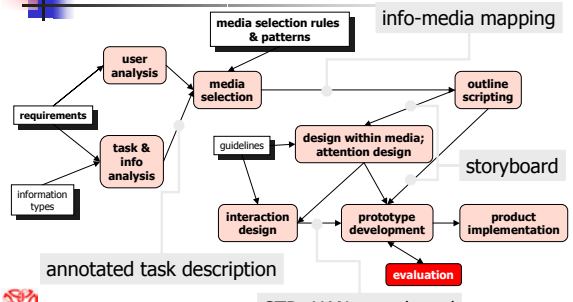
The City Design Method: Prototyping



Prototyping

- Like any user-centred process, should prototype
- Often easy to follow rapid prototyping lifecycle
  - use storyboard as prototype for evaluation
  - If not, mock up a few pages to give the look and feel
- Problems can come when using a false setting for prototype
  - e.g. when ignoring the performance of variable bandwidth streamed video
  - So, technical constraints must be checked in parallel.

The City Design Method: Evaluation



Evaluation Exercise: What Were Your Criteria?

- Match to Task & User
  - Appropriate goals
  - Personalisation
  - Information Content
- Media
  - Choice
  - Design
  - Integration
  - Production Quality
- Interaction
  - Affordances
  - Efficiency
  - Navigation
- Impact
  - Attentional issues
  - Affective quality

Evaluation Exercise Excerpts 1

- Match to task & user
  - Goal
    - "too much emphasis on entertainment"
  - Personalisation
    - "option of running the intro or not"
  - Information content
    - "did not give a great deal of information"
    - "covered all aspects of poker"

Evaluation Exercise Excerpts 2

- Choice
  - "too much text"
  - "had to strain our eyes…"
  - "media usage appropriate"
  - "great use of media; would like another opportunity to really look at the content to see if it's any good"
- Design
  - "text is small"

Evaluation Exercise Excerpts 3

- Integration
  - Lack of link between video and voiceover
  - Confusing fade to black between video scenes
  - No high level view of table & players
  - "overview was a good indicator of what was to come"
  - "good design (videos embedded in microwave)"

Evaluation Exercise Excerpts 4

- Quality
  - "video quality wasn't ideal considering you really need to see what's going on in the instructions"
  - "well edited"
  - "some of the acting was bad"

Evaluation Exercise Excerpts 5

- Attention
  - "wasn't clear that the text on the screen was changing when we clicked on pictures"
  - "no interesting editing techniques used to maintain attention"
  - "really well edited made watching the videos exciting, grabbed attention and maintained it. Good use of music"

Evaluation Exercise Excerpts 6

- Affect
  - "entertaining"
  - "boring video" (could be media choice)
  - "site not attractive and thus not very appealing to user's attention"
  - "not a particularly interesting topic"
  - "use of colors were a bit too aggressive and that might scare a user away"

Evaluation Exercise Excerpts 7

- Interaction
  - Affordances
    - "…indicate you can click on them by moving"
    - "mouse over explanations give a sense of what will happen when you click on a button"
  - Efficiency
    - "don't like the scrollbars – effort required to get the necessary information"
  - Navigation
    - "not clear where you are in relation to rest of the site"
    - "no clear trail through the site"
    - "navigation intuitive"

Petersen's Evaluation Categories

- Subjective feeling experienced by the user
- Conceptual design
- Interaction and Navigation
- Means of presentation
- Technological characteristics versus qualities of human senses

New Evaluation Methods

- new evaluation methods
  - there are no widespread methods of evaluation customised for multimedia
  - however, research is underway to exploit psycho-physical measures
    - Wilson & Sasse. *(2000) Do Users Always Know What's Good For Them? Utilising Physiological Responses to Assess Media Quality.* In Proceedings of HCI 2000.

Authoring Models

- time line
  - Director
- flowchart-based models
  - Authorware
- book / card metaphor
  - HyperCard, SuperCard
- storyboard
  - Cinekit

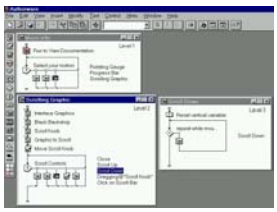
Timeline-Based Tools

- Director
  - set of layers
  - each layer has elements cast members
  - can attach scripts to elements using Lingo scripting language


```
on mouseUp
  go to "shot2"
end mouseUp
```

Flowchart-Based Tools

- Authorware
  - flowchart populated with
    - events
    - actions
    - routines



Book Metaphor-Based Tools

- Medi8or
  - page or card-based
  - direct manipulation of page elements
  - transitions between pages and page elements can be controlled

Storyboard-Based Tools

- Cinekit
  - elements grouped into scenes and shots within scenes
  - "script" attached to scenes for development