Designing for Multimedia

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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

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

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

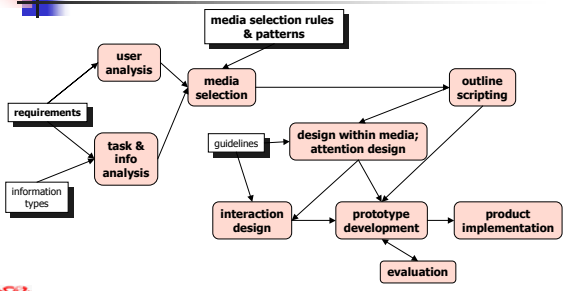
City Method Design Guidelines

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

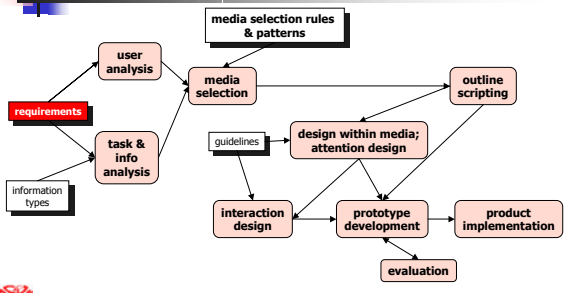
Design Process Overview

- 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



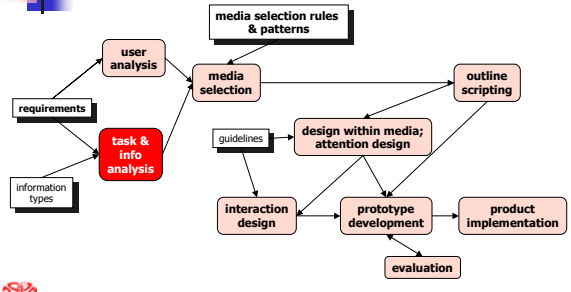
The City Design Method: Requirements



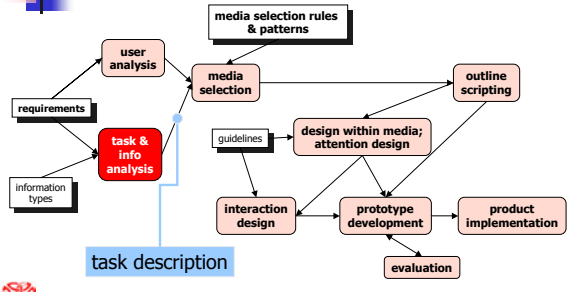
Requirements

- 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?
- 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



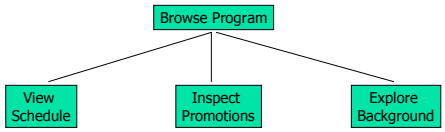
Task Description

- Lots of choices
  - task trees
    - GOMS
    - TKS
    - ConcurTaskTrees
  - task tables (UAN and XUAN)
  - state transition diagrams (including Petri Nets)
  - timeline-based representation
- we'll use a simple task tree

TaskTrees

- hierarchic task modelling notation
- graphical
- nodes represent subtasks
- goal
- constraints
- decomposition into subtasks
- good at expressing temporal properties of complex tasks
- all the "action" is at the leaf nodes

Example Task Tree



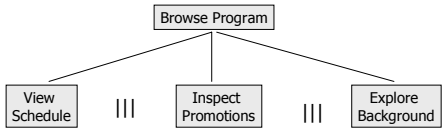
ConcurTaskTrees

- Form of hierarchic task modelling
- good at expressing temporal properties of complex tasks
- can show dynamic relationship of media and interaction

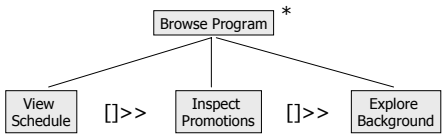
ConcurTaskTree temporal operators

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

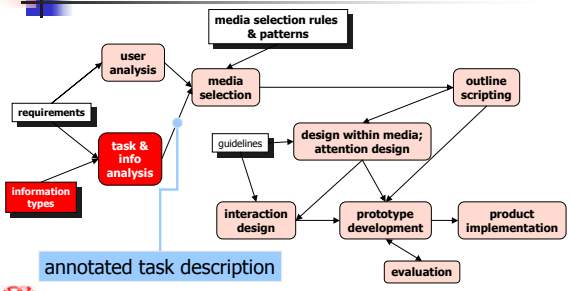
ConcurTaskTrees Example 1



ConcurTaskTrees Example 2



The City Design Method: Information Analysis



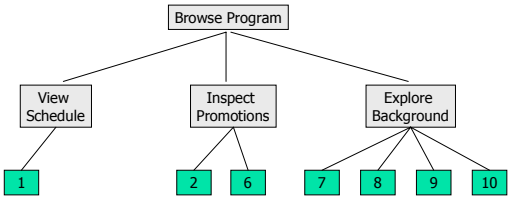
Information Design

- 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

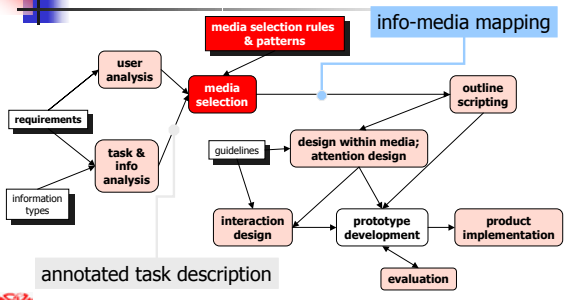
ConcurTaskTrees Example 1



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

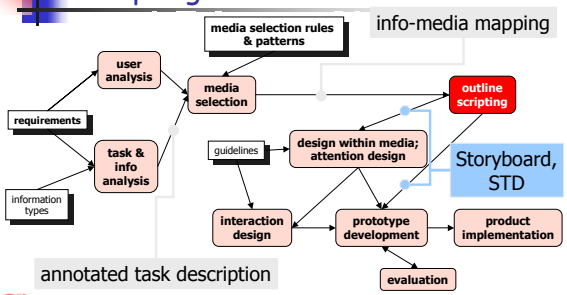
Media Patterns

- 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

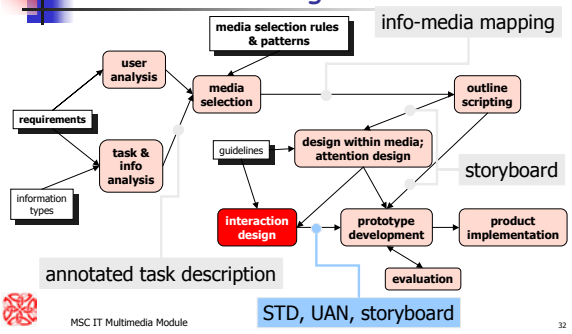
The City Design Method: Scripting



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

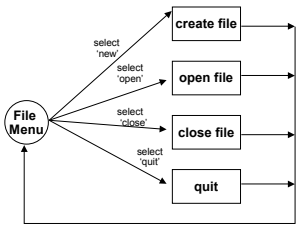
The City Design Method: Interaction Design



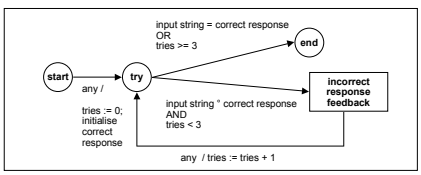
STDs for dialogue design

- STD= state transition diagram
- states represent decision points
- transitions represent conditions & actions

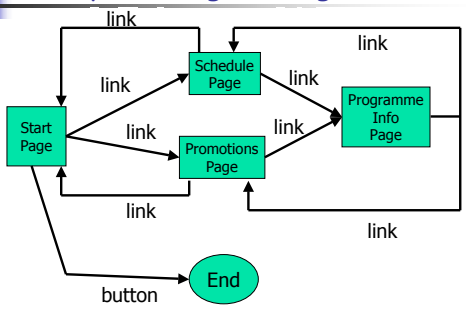
A simple STD dialogue spec



Another STD



A Simple Dialogue using a STD



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

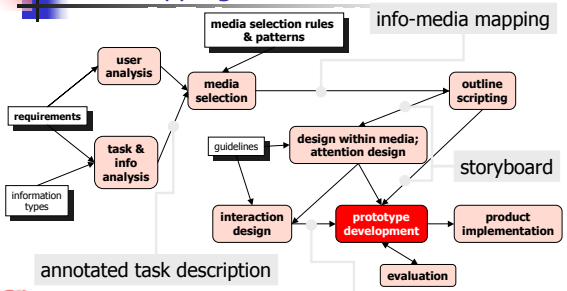
Orientation and Navigation

- 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

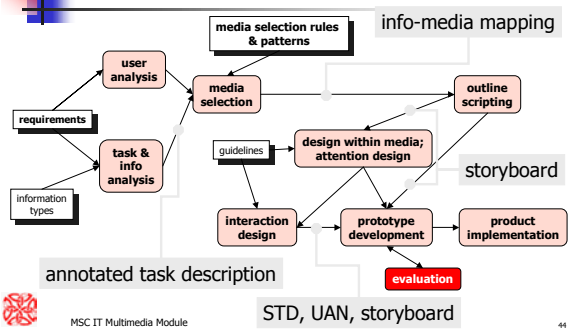
The City Design Method: Prototyping



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



Gray's Basic Evaluation 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

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

- Marianne Petersen, Towards Usability Evaluation of Multimedia Applications, ACM Crossroads, 4,4. 1998.

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.