

Notes on the Software Design Process

- » UCD phases & artifacts
- » Organizational models
- » Leadership issues
- » Information architecture

- **UI Designer at Involution Studios**

Private design studio in Santa Clara

- Previously: frogdesign, Adobe, BEA, Oracle
- Master's in Interaction Design from Carnegie Mellon

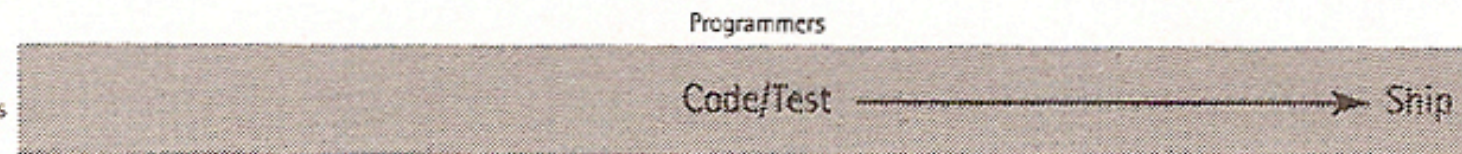
- **Lecture Overview**

- Role/place/function of design in organizations
- Scope of design activity within software development
- UCD process phases and artifacts
- Issues of design leadership
- What is information architecture

Evolution of the Software Development Process

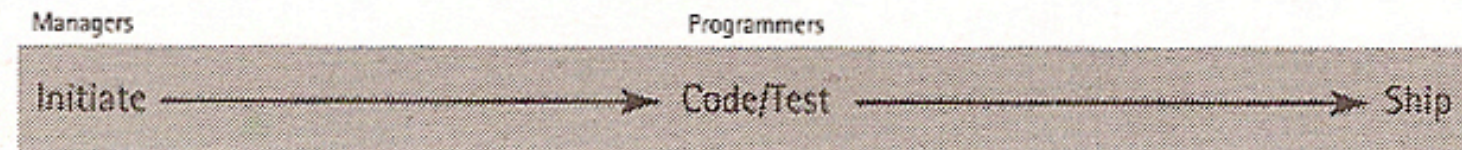
1. Originally, programmers did it all:

In the early days of the software industry, smart programmers dreamed up useful software, wrote it, and even tested it on their own. But as their businesses grew, the software business and software products became more complicated.



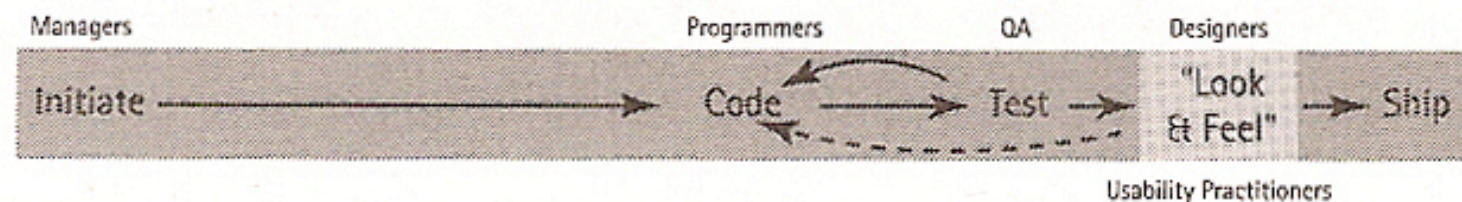
2. Managers brought order:

Inevitably, professional managers were brought in. Good product managers understand the market and competitors. They define software products by creating requirements documents. Often, however, requirements are little more than a list of features, and managers find themselves having to give up features in order to meet schedules.



3. Testing and design became separate steps:

As the industry matured, testing became a separate discipline and a separate step in the process. In the move from command-line to graphical user interface, design and usability also became involved in the process, though often only at the end, and often only affecting visual presentation. Today, common practice includes simultaneous coding and design followed by bug and user testing and then revision.



4. Design must precede the programming effort:

A goal-directed approach to software development means that all decisions proceed from a formal definition of the user and his or her goals. Definition of the user and user goals is the responsibility of the designer—thus design must precede programming.

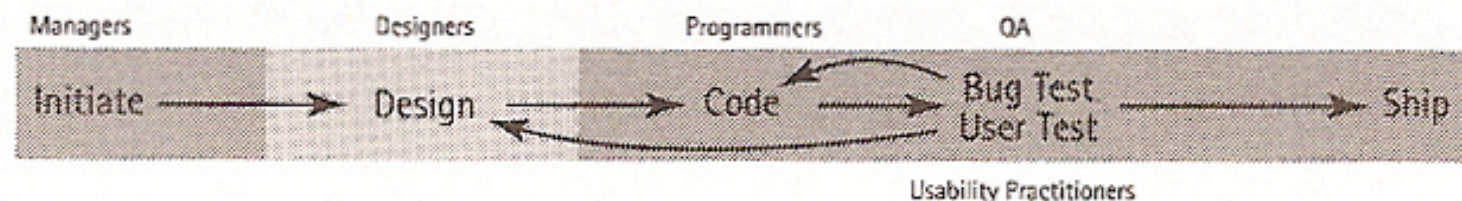


Figure 1-1: The evolution of the software development process. Today, design is often an afterthought. It should, instead, happen before any coding or testing begins.

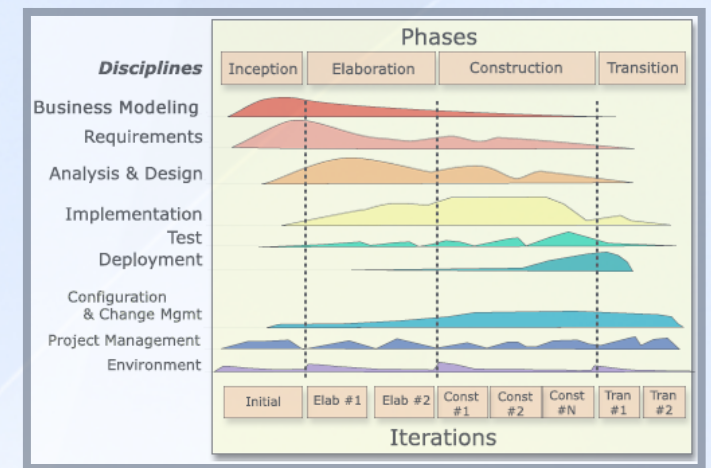
~ Alan Cooper, About Face 2.0

● Rational Unified Process

Iterative software development process framework

Based on a set of key principles for business-driven development

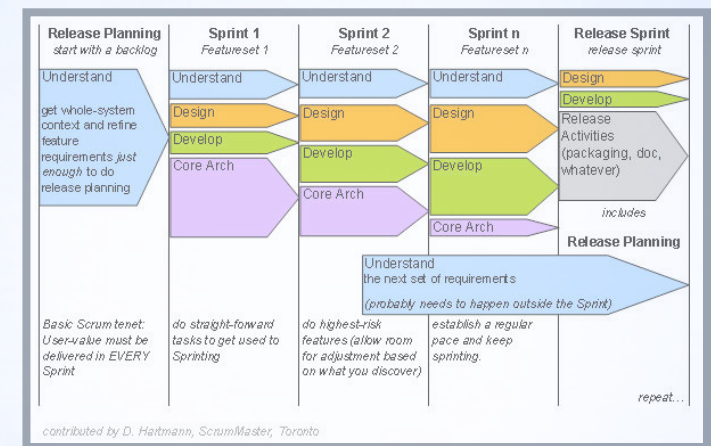
1. Adapt the process
2. Balance stakeholder priorities
3. Collaborate across teams
4. Demonstrate value iteratively
5. Elevate the level of abstraction
6. Focus continuously on quality



from Wikipedia.org

● Agile Programming

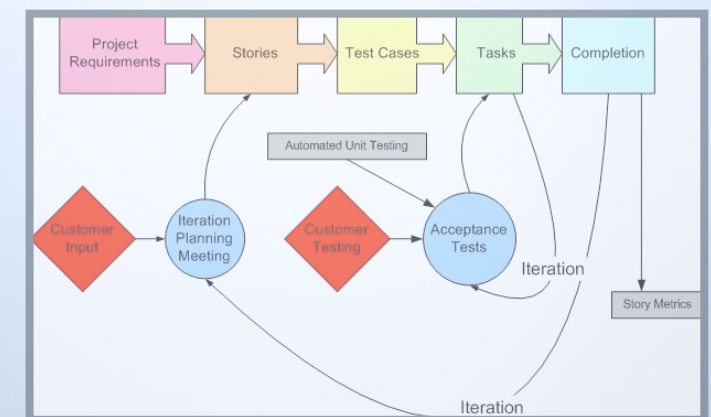
Most agile methods attempt to minimize risk by developing software in short iterations, which typically last one to four weeks. Each iteration is like a miniature software project; reaction against waterfall method



from Wikipedia.org

● Extreme Programming

XP regards ongoing changes to requirements as a natural, inescapable and desirable aspect of software development projects; they believe that being able to adapt to changing requirements at any point during the project life is a more realistic and better approach



from Wikipedia.org

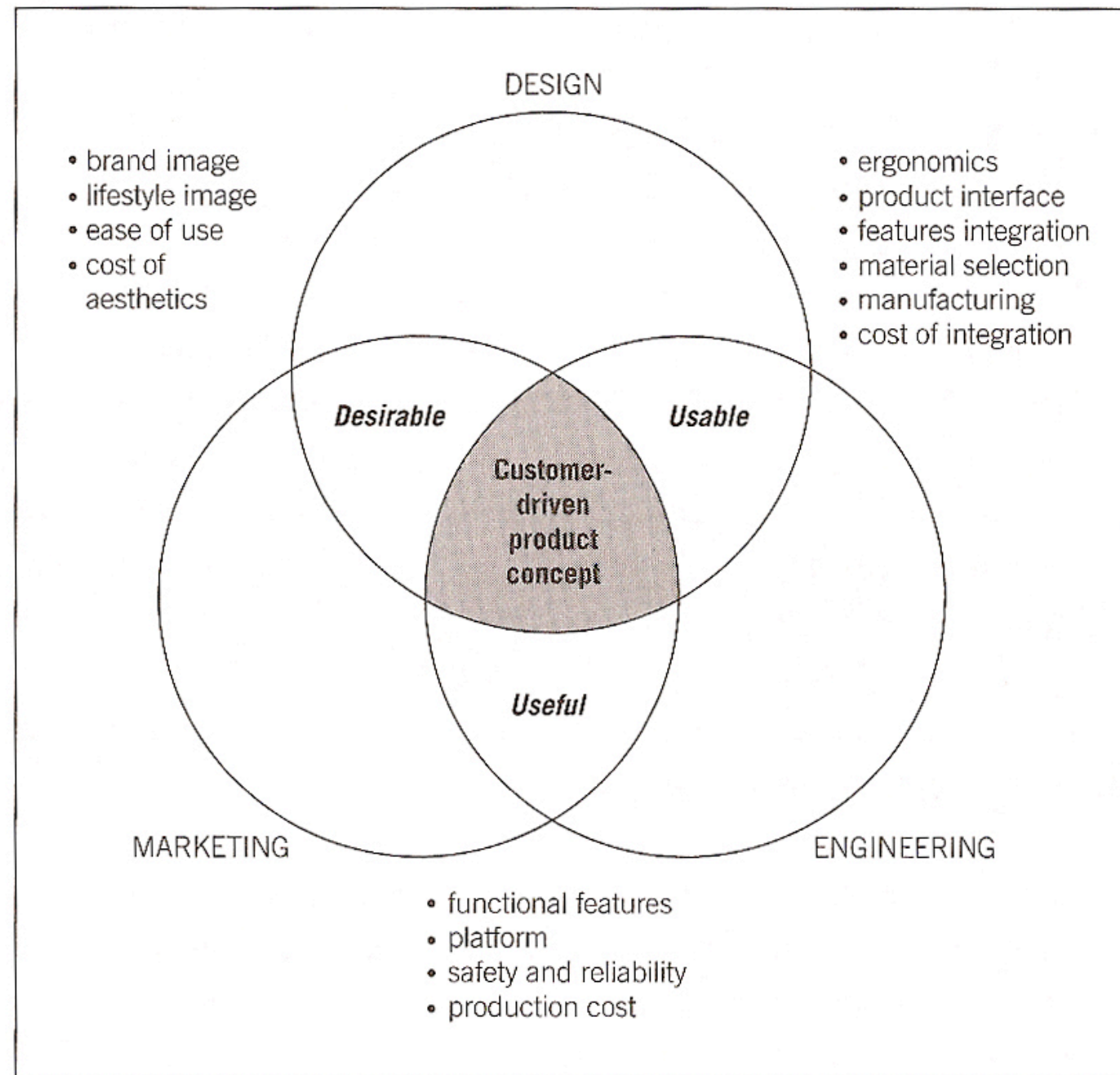
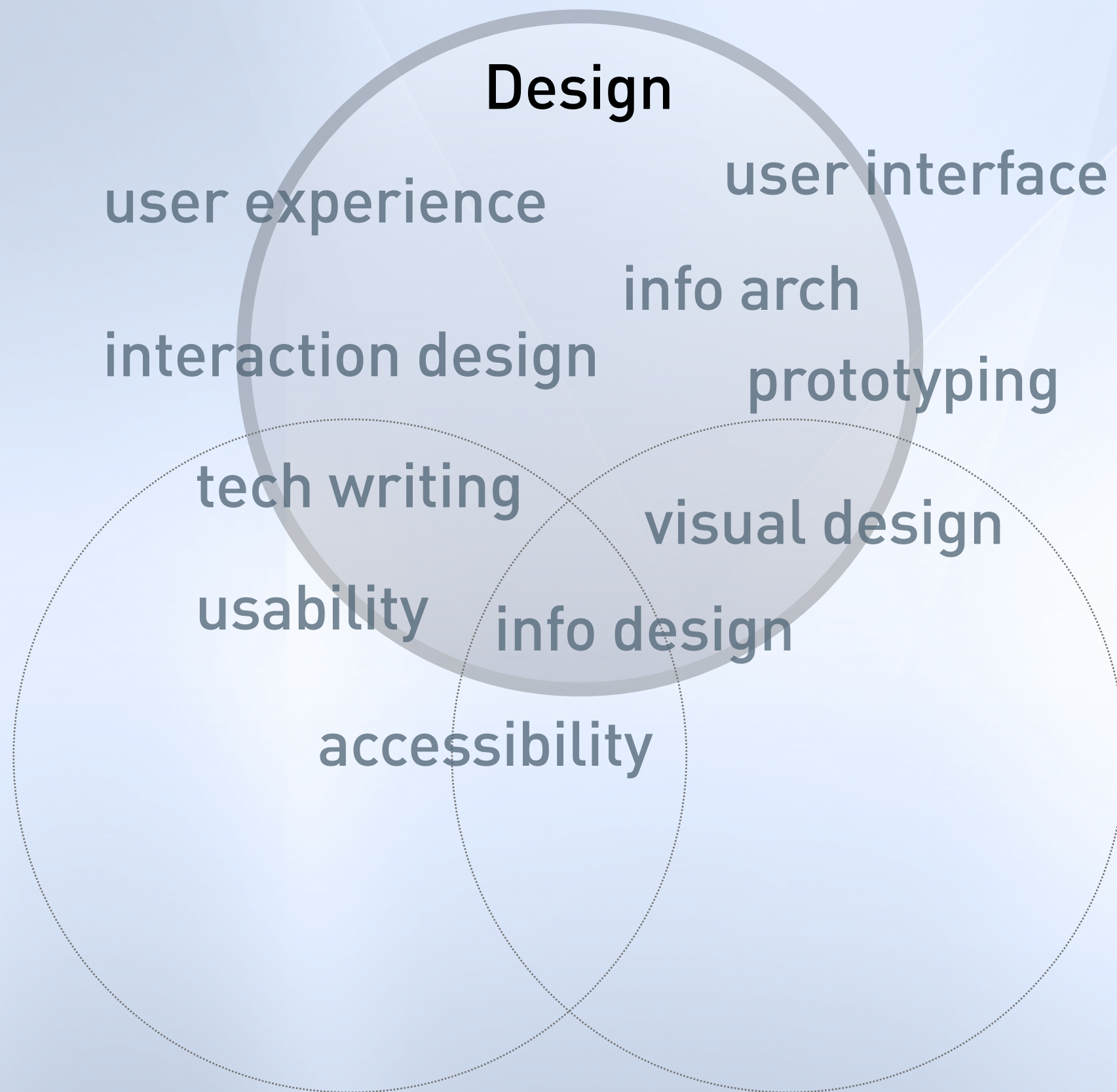


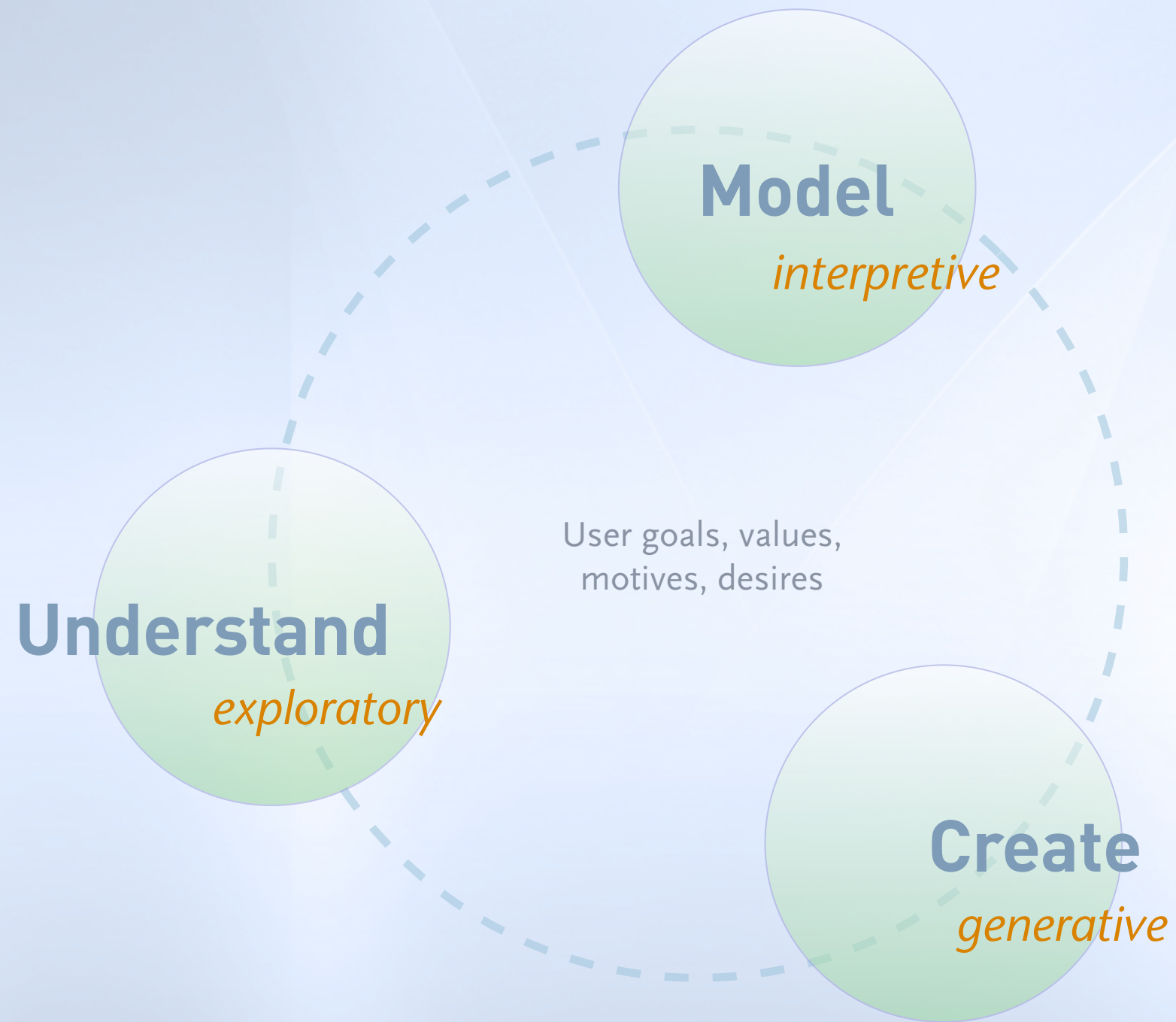
Figure 6.2 Overlap of disciplines leads to value: User-centered iNPD.

~ Cagan/Vogel, Creating Breakthrough Products

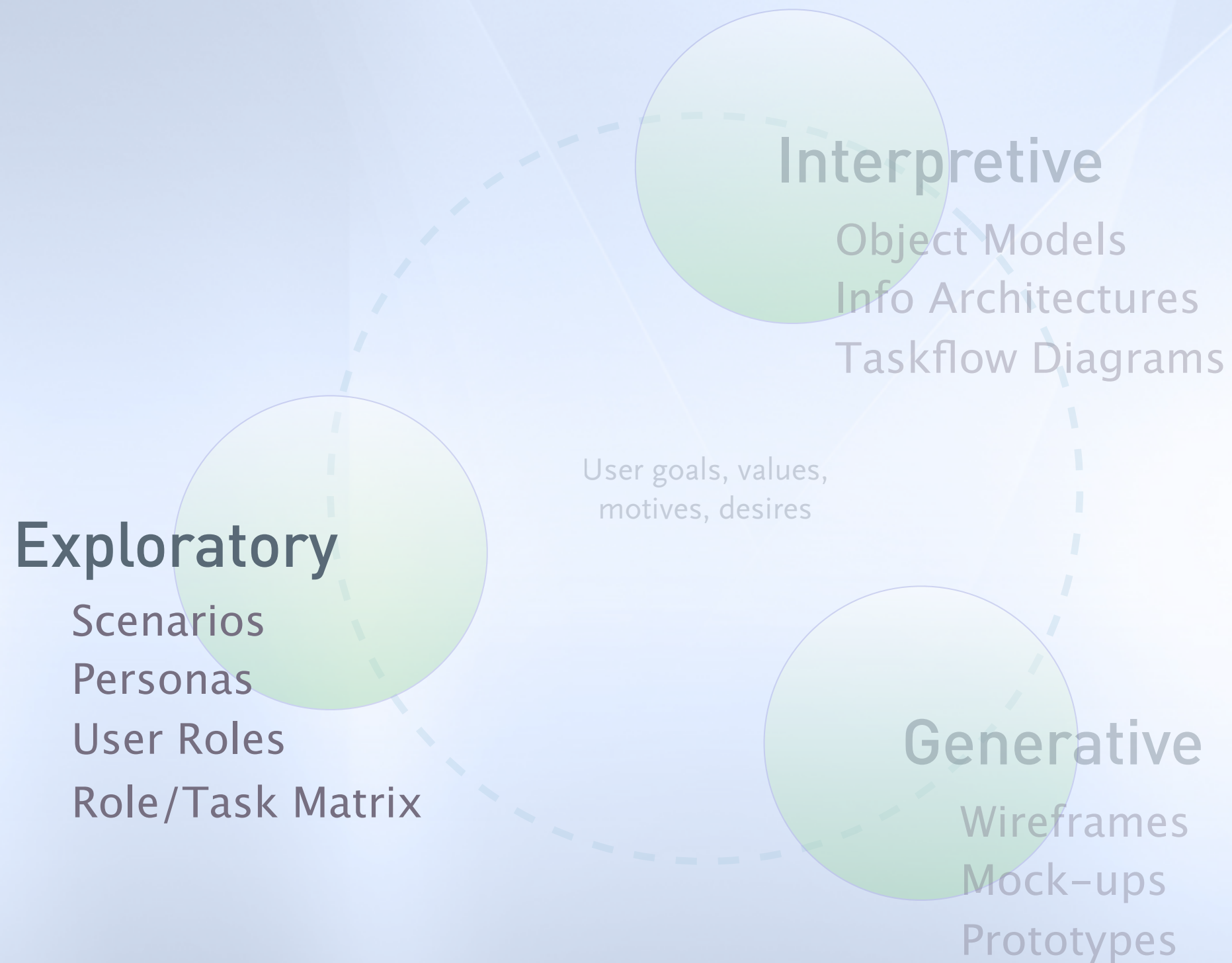
iNPD Model Overview



Design Disciplines



UCD Process



UCD Artifacts/Phases

Product Functionality Document

Product: Cash Leveling/Treasury UI
Expected Release Version:
Created by: Uday.Gajendar
Last Updated: 2/13/2003 3:18:00 PM

This document lists all of the functionality throughout an application in all of its components/modules. This information is used to determine the users tasks in an application, why they are done and what their relationships are. It is used in conjunction with the Product Roles document to create the Tasks/Roles Matrix.

Layout

Functional Area Name

Mission Statement clearly defining the purpose of the following functions, their scope and why they are important to the system.

#	Priority	Function Name	Description	Other
1	P1	Internal FunctionName External FunctionName Competitor - Competitor Names	What: What does the function do? Ex. Allows user to enter a user name and password to authenticate to the system. Why: Why does it exist? Ex. Creates relationship between user response and user response. When: When does it exist? Ex. At the be of ABC request. Dependencies: Ex. Used by	Person Hours ReqCat

Parts

- Priority**
P0 - Non negotiable. It isn't a functional product without
P1 - Critical. Product can initially exist without this feat
P2 - Differentiating feature. May provide significant us
P3 - Nice to have.
Ø – Considered but dropped.
- Function Name**
The unique identifier by which a task will be known. Best s and Initiate.
Internal FunctionName - The name given in developm
External FunctionName - Optional – name given after
Competitor's Names – Optional – Competitors names
- Description**
Basic – Text stating what data and actions are require
Reason - Optional - Statement if functionality needs cl
Dependencies – List/Description of other functions req
- Other Measures**
While not necessarily assisting in the design process the fo
Person Hours - Effort
Requirement Categorization - Functional, Usability, Ma
Version - If something gets pushed, what version it is

Product Roles Template

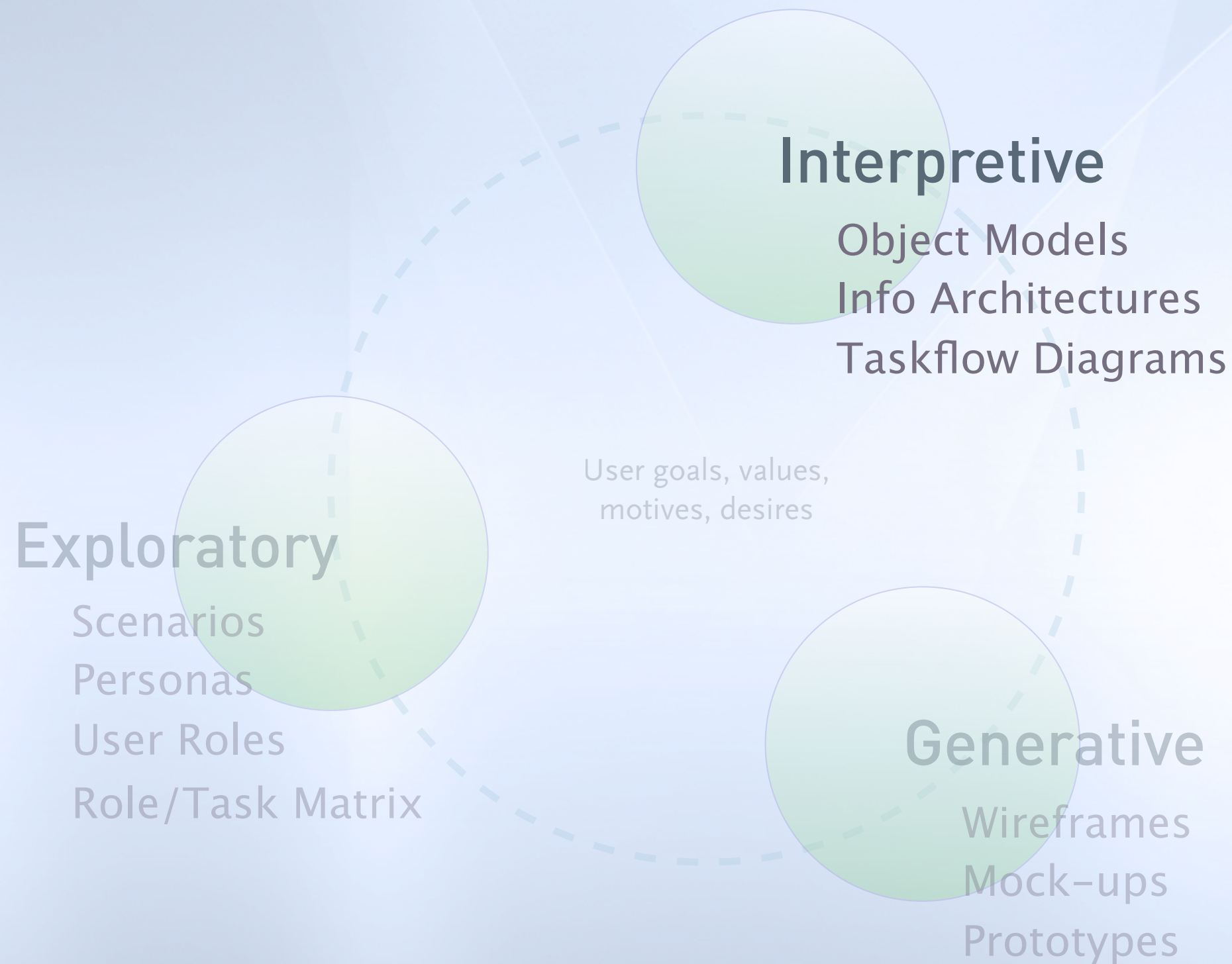
Product: Cash Leveling/Treasury UI
Expected Release Version: 1
Created by: Uday Gajendar
Last Updated: 11/21/2003 9:15:00 AM

This document details different roles that users will have on the application giving insight into the users background, knowledge and place in an organization.

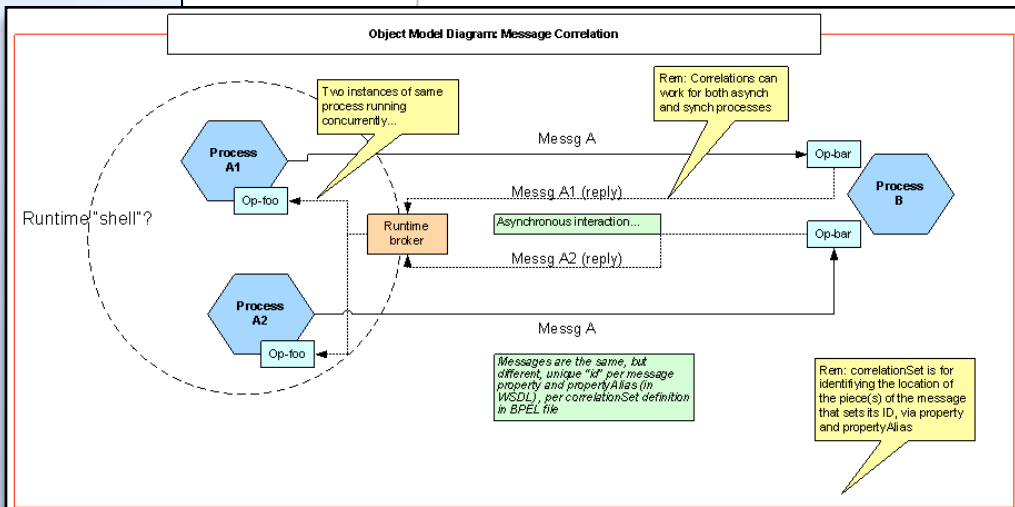
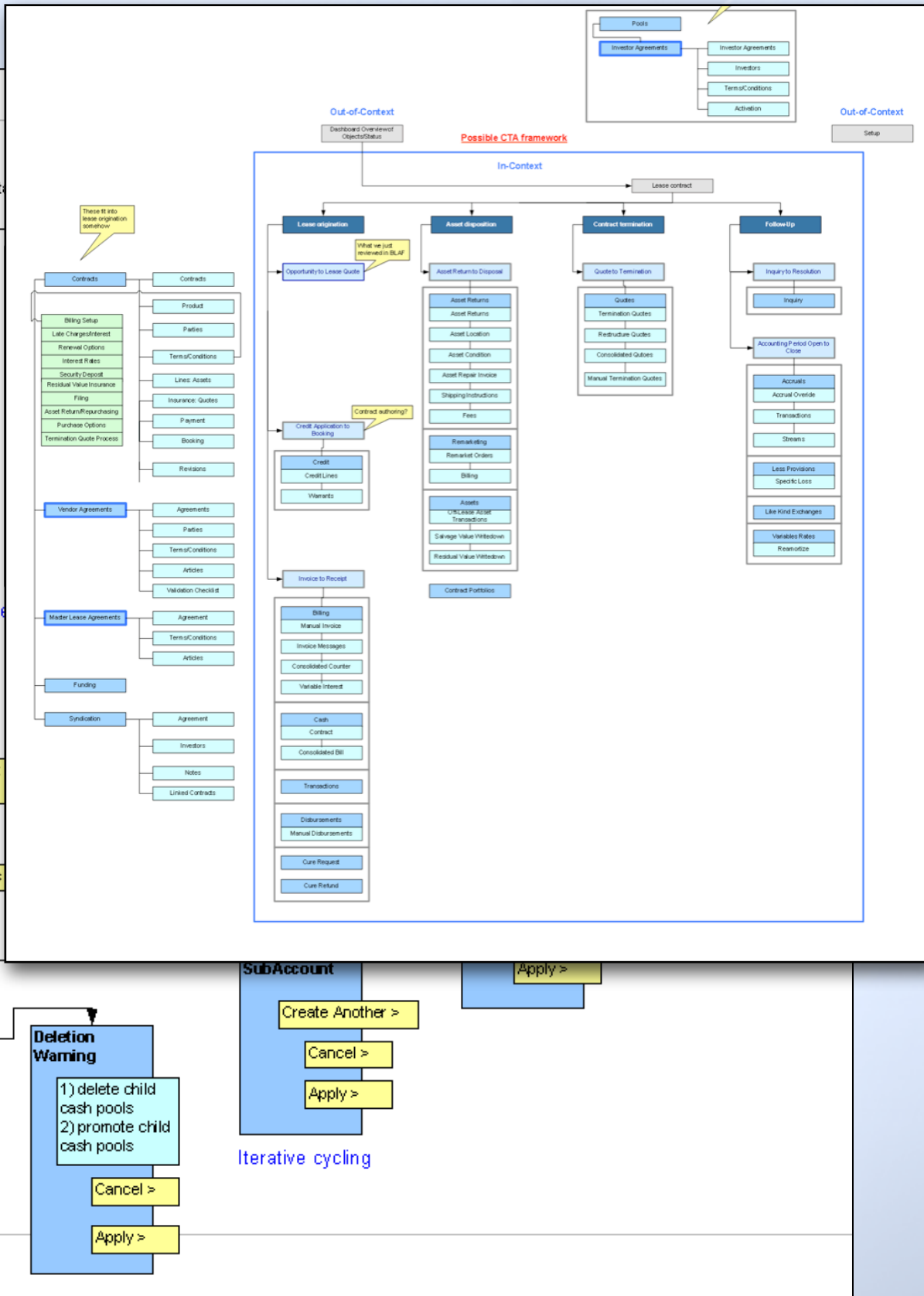
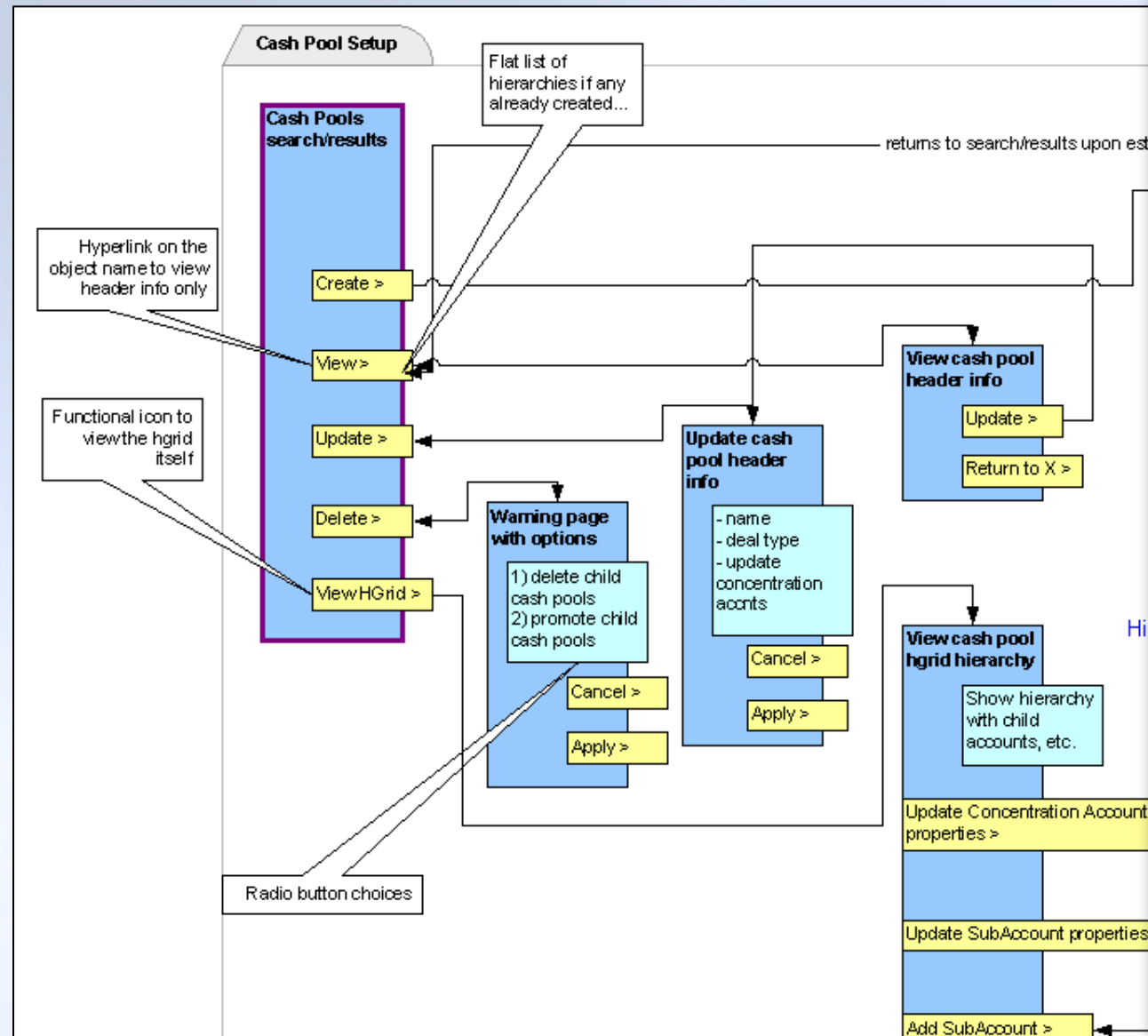
- Columns should be labeled by the roles primary title. (Ex. - Marketing Manager, Field Services Representative, Functional Administrator, End User)
- Put the primary role in the first column and prioritize additional roles to the right
- Add columns for additional roles.

User Questions	Role 1	Role 2
1. What job titles are associated with this role. Ex. Marketing Manager, Campaign Manager	Treasury Manager, Treasury Analyst, Cash Management Analyst, Cash Managers (are these the same?)	Some have view-only access to cash position screens and others can initiate transfers—diff roles??
2. What is a short description of the roles job function? Ex. Marketing Manager creates and maintains marketing campaigns, is responsible for budget and meeting deadlines.	Optimizes the balances of cash/business accounts	
3. What departments/divisions/units would you expect to find them in? Ex. Marketing, Sales, Information Systems	Treasury/cash management dept. of the company (USA) or external banking institution (Europe)	
4. What percentage of the users of the application have this role? Note: The percentages should total 100% across the rows.		
5. About how many years of experience would you expect them to have in that position? Is there a minimum? Ex. Min. 6m to 1y, at least 2 years, 3 years		
6. What is/are the area(s) of domain expertise? Ex. Marketing, Sales	Banking practice	
7. How much experience would you expect them to have in their domain? Ex. None, Several years, At least 6y		
8. Are there certain domain tasks that you would expect the user to perform that would be relevant to this application? Ex. Ability to plan marketing campaigns, creating sales orders, making bids	Manag original transac Treasu Manag intrada daily p project modify amount expect cash tr	

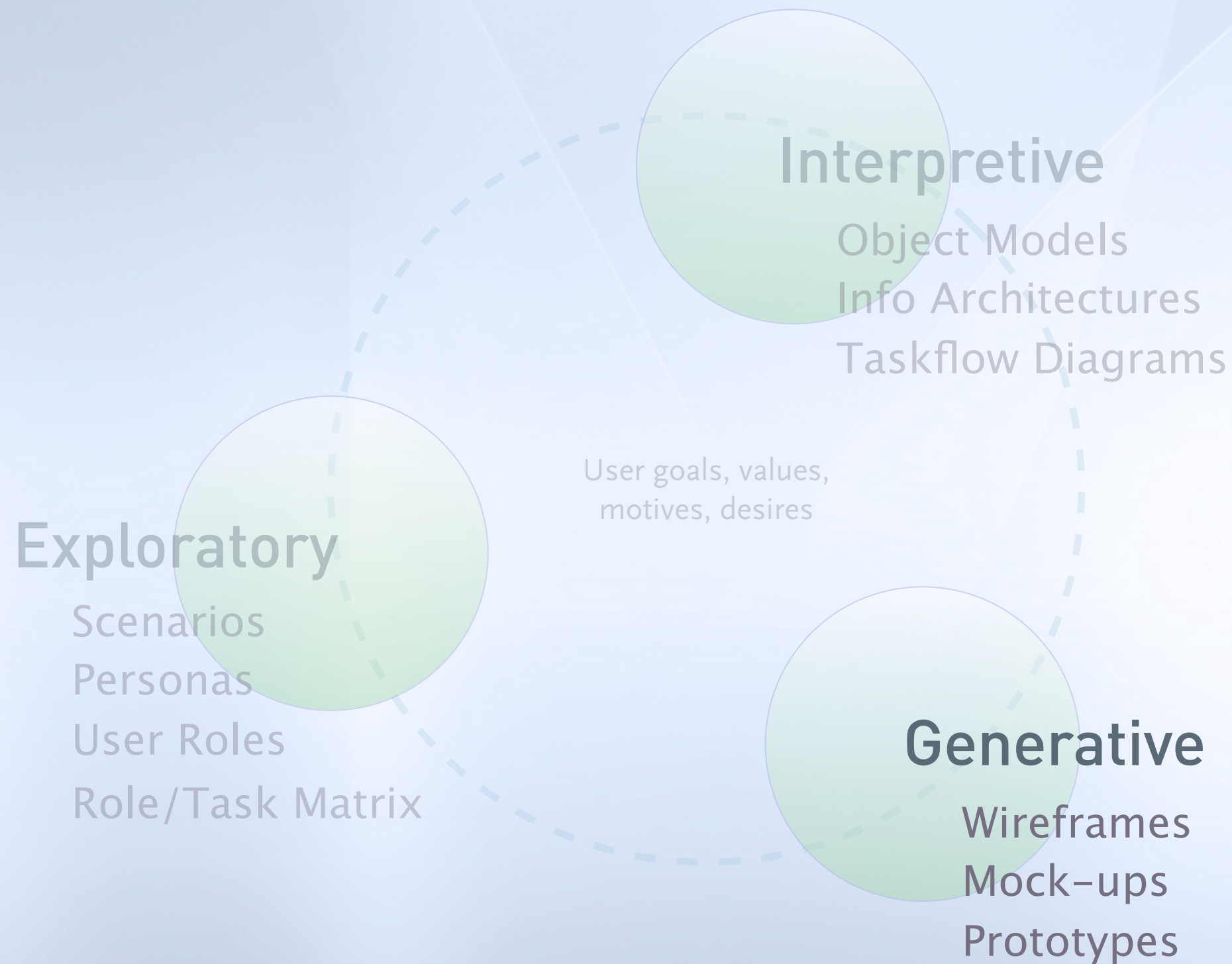
	A	B	C	D	E	F	G
1	ID	Sequence	High Level Tasks	Process / Activity	Complexity	Integration	Cash Manage
2							
3	1a	1	Define Cash Pool Name	Create Cash Pool	C		X
4	1b	1	Define Cash Pool Currency	Create Cash Pool	C		X
5	1c	1	Define Cash Pool Type (Notional/Physical)	Create Cash Pool	C		X
6	1d	1	Assign an investment concentration account (allow the same as fund	Create Cash Pool	C		X
7	1e	1	Assign a funding concentration account (allow the same as investme	Create Cash Pool	C		X
8	2a	1a	Assign a bank account as a sub-account to Cash Pool	Create Cash Pool	C		X
9	2b	1b	Define minimum target balance	Create Cash Pool	C		X
10	2c	1b	Define maximum target balance	Create Cash Pool	C		X
11	2d	1b	Define minimum payment amount (optional)	Create Cash Pool	C		X
12	2e	1b	Define maximum receipt amount (optional)	Create Cash Pool	C		X
13	2f	1b	Define transfer amount rounding factor (optional)	Create Cash Pool	C		X
14	2g	1b	Define the deal type associated with the transfer and define the deal	Create Cash Pool	C		X
15	3a	1a	Assign Cash Pool as a sub-account to another Cash Pool	Create Cash Pool	C		X
16	3b	1b	Define minimum target balance (for each concentration account)	Create Cash Pool	C		X
17	3c	1b	Define maximum target balance (for each concentration account)	Create Cash Pool	C		X
18	3d	1b	Define minimum payment amount (optional) (for each concentration ac	Create Cash Pool	C		X
19	3e	1b	Define maximum receipt amount (optional) (for each concentration acc	Create Cash Pool	C		X
20	3f	1b	Define transfer amount rounding factor (optional) (for each concentra	Create Cash Pool	C		X



UCD Artifacts/Phases



Interpretive



UCD Artifacts/Phases

BEA WebLogic Workshop :: ProcessApplication123 >> process123.bpel

status bar server running play

File Edit View Insert Build Debug Tools Window Help Zoom100%

Files Application

flow view | source view

WSDLs

Services

builder window title

controls and services

application messages

process123.bpel

Declarations X

Variables

Name	Type
chi	date
epsilon	date
beta	int
alpha	string
delta	date

Sort By: Alphabetical Reverse Alpha

Scopes <name> Namespace prefix: foo Namespace URI: http://schemas.xmlsoap.org/ws/2003/03/business

Variables Menu

Add Variable Collapse all Expand all Sort Table

PartnerLinks Menu

Add PLink Collapse all Expand all Sort Tree Show Port Types Hide Roles

Correl Sets Menu

Add Correl Set Sort Table

Properties

Property one property two property three property four

Sort By: Alphabetical Reverse Alpha

Create PartnerLink

Partner Link Name

Partner Link Type

My Role

Role A ViewOperations Role B ViewOperations

Operations

Edit Properties

Correlation Set Name Somenamewhere

Web Service Foo

Available Properties

Property five property six

Selected Properties

Property one property two property three property four

Add Properties

Correlation Set Name Somenamewhere

Web Service Foo

Available Properties

Property five property six

Selected Properties

Property one property two property three property four

Generative

- Centralized enforcement group
- Advanced concepts “splinter cell”
- Embedded within engineering team
- Centrally managed, BU-funded designers
- Internal consultancy model
- External pay-for-hire agency

Organizational Models

- Adaptive humanist leader
- Be like ecologists: system of consequences
- Total product lifecycle view of situation
- Ask critical questions
- Persuasive communication/influence
- Hidden dependencies/support group

Designing anything involves satisfying constraints, making choices, containing costs, and accepting compromises.

Henry Petroski

Leadership Issues

● What is IA?

The art and science of structuring and organizing information environments to help people achieve their goals.

Lou Rosenfeld, Argus Assoc.

IA encompasses all the design and structure from the back-end to through the content to the resulting representation necessary to create an information system useful to end-users.

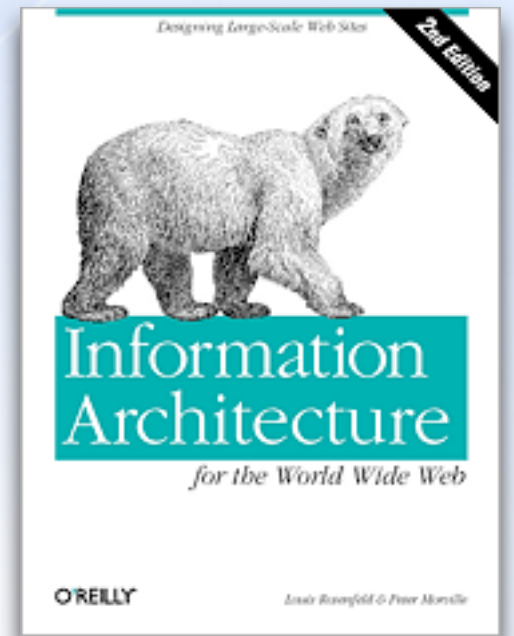
Vivian Bliss, MS Library

Information architecture is a systematic, question-based process for creating communication products that help users meet their needs.

Thom Haller, Info.design

IA is the practice of creating plans that describe the underlying organizational structure for a system of content and interactions.

Steven Ritchey, Sapient



- Application IA: Oracle Financials App
- Intranet IA: Web-based CMS & Style Guide

Information Architecture



HP Consumer UI

HP Consumer UI:

- >> Inductive Model & Glossary
- >> Consumer UI General Guidelines p4
 - >> Branding p6-7
 - >> Fonts
 - >> Color Palettes p8
 - >> Launch Screens p9
 - >> Sounds
 - >> PhotoSmart specific elements
 - >> Iconography **New text**
 - >> Icons p10 - 19
 - >> Information Grafic p19 - 21
 - >> Glyphs p22 - 23
- >> 2" (Embedded Touch/Non Touch) **New text**
- >> 2" (PC Mouse/Touch) **New text**
- >> 10" (Remote/Touch) **New text**

Note 1: Since so many icons in the Iconography page, consider anchored sections for PhotoSmart, Touchstone, Advisor, etc. for better usability and navigation

2" Embedded Touch/Non Touch

2" Embedded Touch/Non Touch:

- >> Infrastructure p82 **New text**
- >> Interaction p83 **New text**
- >> interface p84 **New text**
- >> Page Types p85 - 87
 - >> Menu With Preview
 - >> Multi Image Window
 - >> Launch Window
 - >> Browse Window
- >> Key Layouts & Components p88
 - >> Choice Screen Layout
 - >> Title Bar
 - >> Page Indicator
 - >> Information Pane
 - >> Photo Select One Up Layout
 - >> Keyboard layout
 - ... (and so on, from mariano's IA)
- >> Controls **New text**
 - >> Menu
 - >> Title Bar
 - >> Global Tool Bar
 - ... (and so on, from mariano's IA)
 - [and insert Page Indicator, as a control]
- >> Typography p73
- >> Color p74

For page types, have anchored sections for non-touch and screens, with the PDF screenshot examples, each image to a drilldown page with more detail about each page type (new verbiage, to be coming soon from me and mark) (see 1 on the next page)

For controls, follow mark's email suggestion, of having just text Controls page, and then each pertinent row from the PDF style of the controls/platform/active states

[but place the custom controls at the end, and don't have a labeled hierarchy level for common controls (we'll imply that if it's not custom then it must be common) p57 - 58 for custom cntrls]

PA : 9/14/2006 1:52:24 PM

2" PC Mouse/Touch

2" PC Mouse/Touch:

- >> Infrastructure p25 **New text**
- >> Interaction p26 **New text**
- >> interface p27 **New text**
- >> Window Types p28-30
 - >> Navigation Window
 - >> Multiple Projects Window
 - >> Home Window
 - >> Status Pop-Up
 - >> Message Area
 - >> Tabbed Window
 - >> Dialing box
 - >> Toast Notification
 - >> Mini Dock
 - >> Status Indicator
 - >> Browse Window
 - >> Launch Window
 - >> Grid with Preview
 - >> Dialog Box
- >> Page Types p31 - 34
 - >> Memory Browser
 - >> Library View
 - >> Home
 - >> One Up Photo
 - >> One Up Comparison
 - >> Dashboard
 - >> Note Creation
 - >> Calendar
 - >> Create Event
 - >> Library
 - >> Projects
 - >> Edit/Crop
 - >> Home
 - >> Edit
 - >> Themes
- >> Key Layouts p35 - 40
- >> Controls (use Mariano's)

10" Remote/Touch

10" Remote/Touch:

- >> Infrastructure p76 **New text**
- >> Interaction p77 **New text**
- >> interface p78 **New text**
- >> Page Types p79
 - >> Home View
 - >> Folder View
 - >> Details View

Page layouts are per page types, so expect 2-3 page layout pages to cover all page types for 10" UI

Icon Taxonomy: ConUI style guide

Icons
PhotoSmart
Advisor
Touchstone
Stargate
TouchSmart
Launchpad

Info Grafic
Advisor
Touchstone
Launchpad

Glyphs
PhotoSmart
Advisor
Touchscreen
Stargate
Launchpad

Icon Taxonomy: Tim Wong's draft

(note: this is just covers Printers/PPI)

Info Grafic

Photorealistic

Glyph

Hardware (simple) glyph

Status

Photo Overlay

Checkmark

Size	Rich	Simple	Style
medium/small			
	Icons		
	contextual cues	X	
	functional	X	
	symbolic only	X	
very small			
	Glyphs		
	functional		X
	status	X	X
	modifiers	X	
	overlays		X
	hardware-mapped		X
large			
	Info Graphics	X	
	Object Type		

Glyphs : Overlays

Basic Info/description

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

Visual Qualities

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Usage + Context

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Where typically found...

printers, scanners, cameras, TV, etc.

Any special notes, considerations, etc.

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

document name, other footer info here...

page number

We are searching for some kind of harmony between two intangibles: a form which we have not yet designed and a context which we cannot properly describe.

-- Christopher Alexander

Our guiding principle is that design is neither an intellectual nor a material affair, but simply an integral part of the stuff of life, necessary for everyone in a civilized society.

-- Walter Gropius

End.