



User-Centered Design: UCD Theory & Methods

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Agenda

- Introduction
- Defining UCD
- Models for UCD
- Usability vs User experience
- UX lab overview

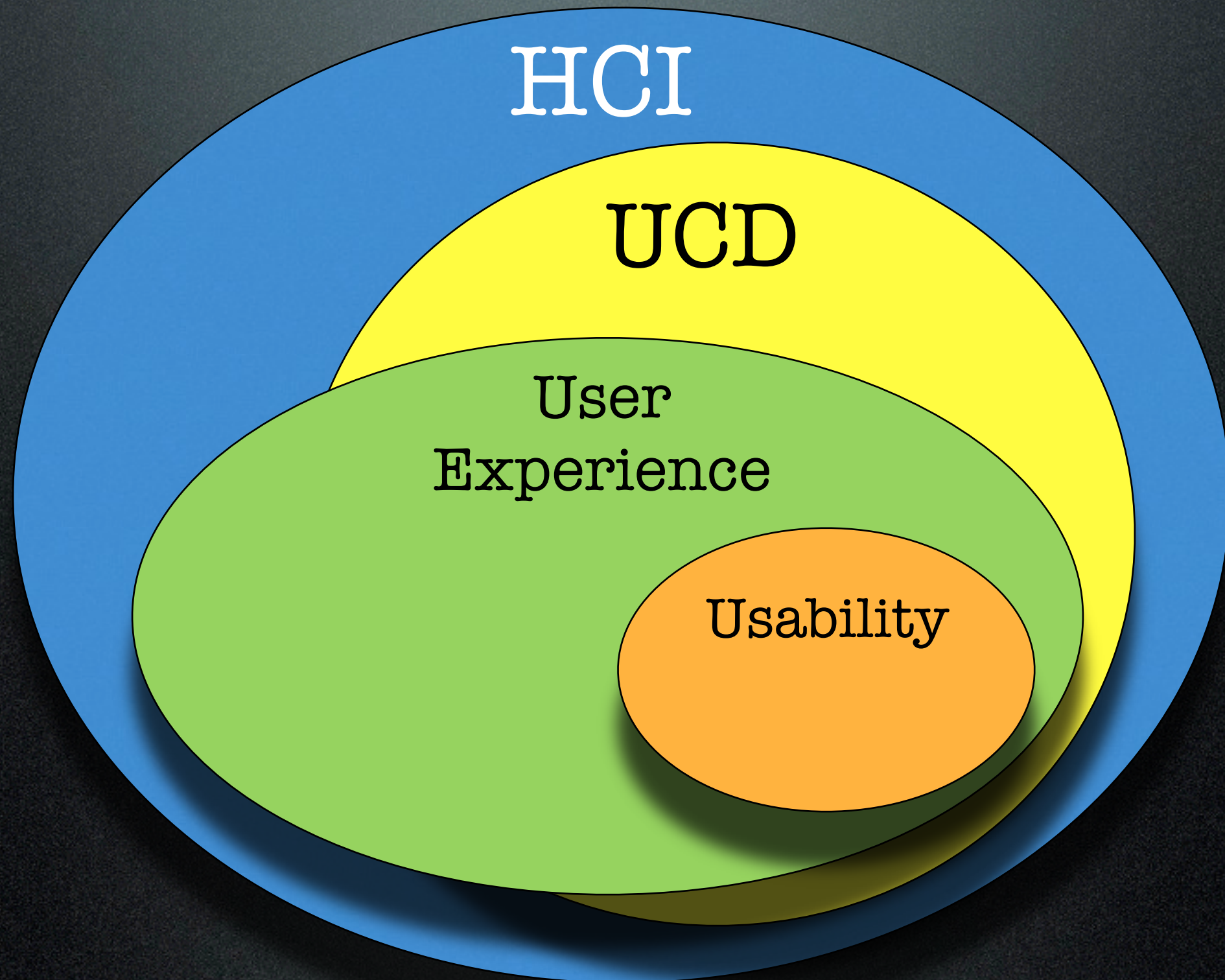


Introductions



- Andrea Peer
- 3rd year P.h.D. student, ISU HCI / MIS
- Experience
 - 4 years in Air Force doing UCD, UX, & usability (kinda)
 - 4 years in industry
 - 3 years of study & consulting gigs

Where Are We?

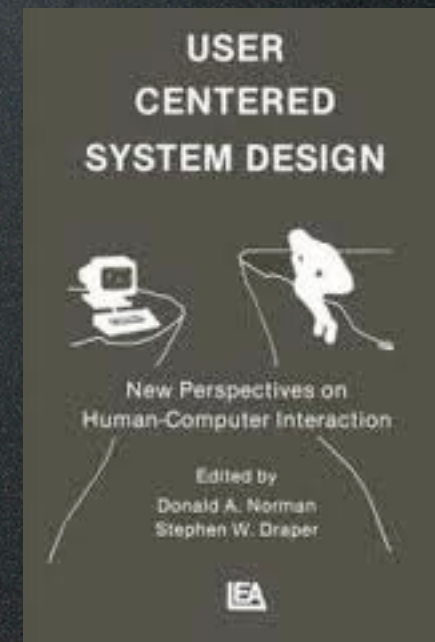


Defining UCD

- Norman
- International Organization for Standardization (ISO)
- Usability Professional Association (UPA)
- ACM Special Interest Group Computer Human Interaction (SIGCHI)
- Usability.gov
- Leaders in the field

UCD According to Norman

- “The Psychology of Everyday Things” (Norman, 1988)
- Design based on the needs of users
 - Simplify structure of tasks
 - Making things visible
 - Capturing conceptual maps
 - Affordances



Norman (1988)

UCD According to ISO



- ISO 13407 & ISO TR 18529
- Human-Centered Design Principles
 - Active involvement of users and a clear understanding of user and task requirements
 - An appropriate allocation of function between users and technology

Nigel Bevan (2009)

UCD According to UPA



- “User-Centered Design (UCD) is an **approach** to design that grounds the process in **information** about the people who will use the product. UCD processes **focus on users** through the planning, design and development of a product.” (UPA, 2010)

UPA (2010)

UCD According to SIGCHI



- Graphic design basics
- Alternative system development process
- Task analysis
- Design specifications
- Design analysis
- Industrial design basics
- Empirical analysis of design

SIGCHI (1996)

UCD According to Usability.gov



- “User-centered design (UCD) is an approach for employing **usability** It is a structured product development **methodology** that involves users throughout all stages of Web site development, in order to create a Web site that meets users’ needs. This approach considers an organization’s business objectives and user’s needs, limitations, and preferences.”

Usability.gov (yr?)

UCD According to Andrea

Process for systems development
& evaluation

Data-Driven

Contextual

Focus on users

and their tasks

throughout the SDLC

Grounded in measured &
observed user behavior

Performance and
satisfaction focus

Measured ROI

UCD According to Andrea

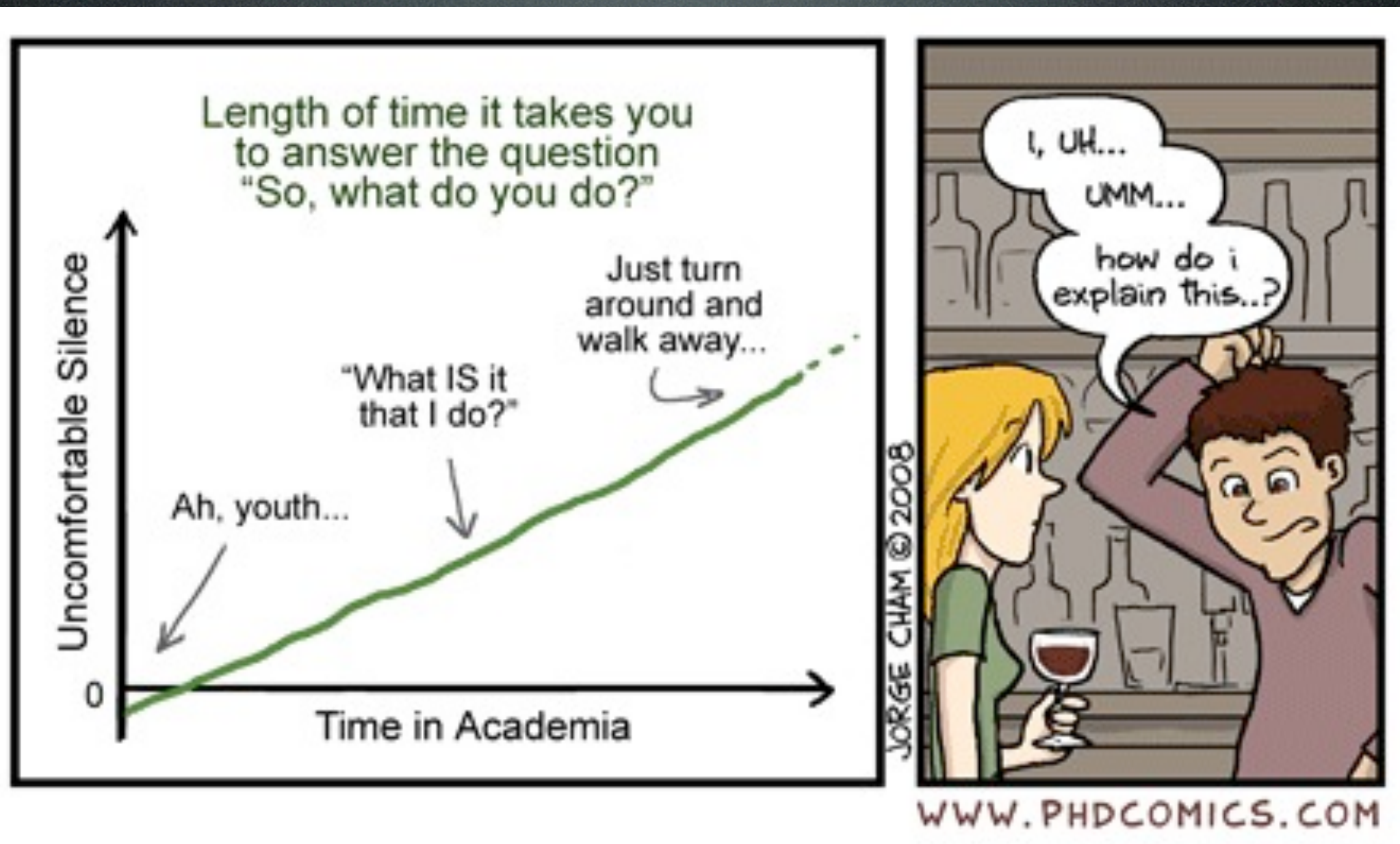
- A philosophy - We believe...
 - The users know what they want. They just don't have the skills, knowledge, abilities or understanding of the problem space to communicate what they want.
- A set of practices
 - Theoretically can be plugged into any software development process

UCD According to You

- How would you define UCD?

Models for UCD

- UCD Process models
- Variables to consider with UCD



Models for UCD

- Usability.gov
- Usability Professional Association (UPA)
- Usability Planner Tool
- Usability Body of Knowledge (Usability BOK)

UCD Process Models

Usability.gov

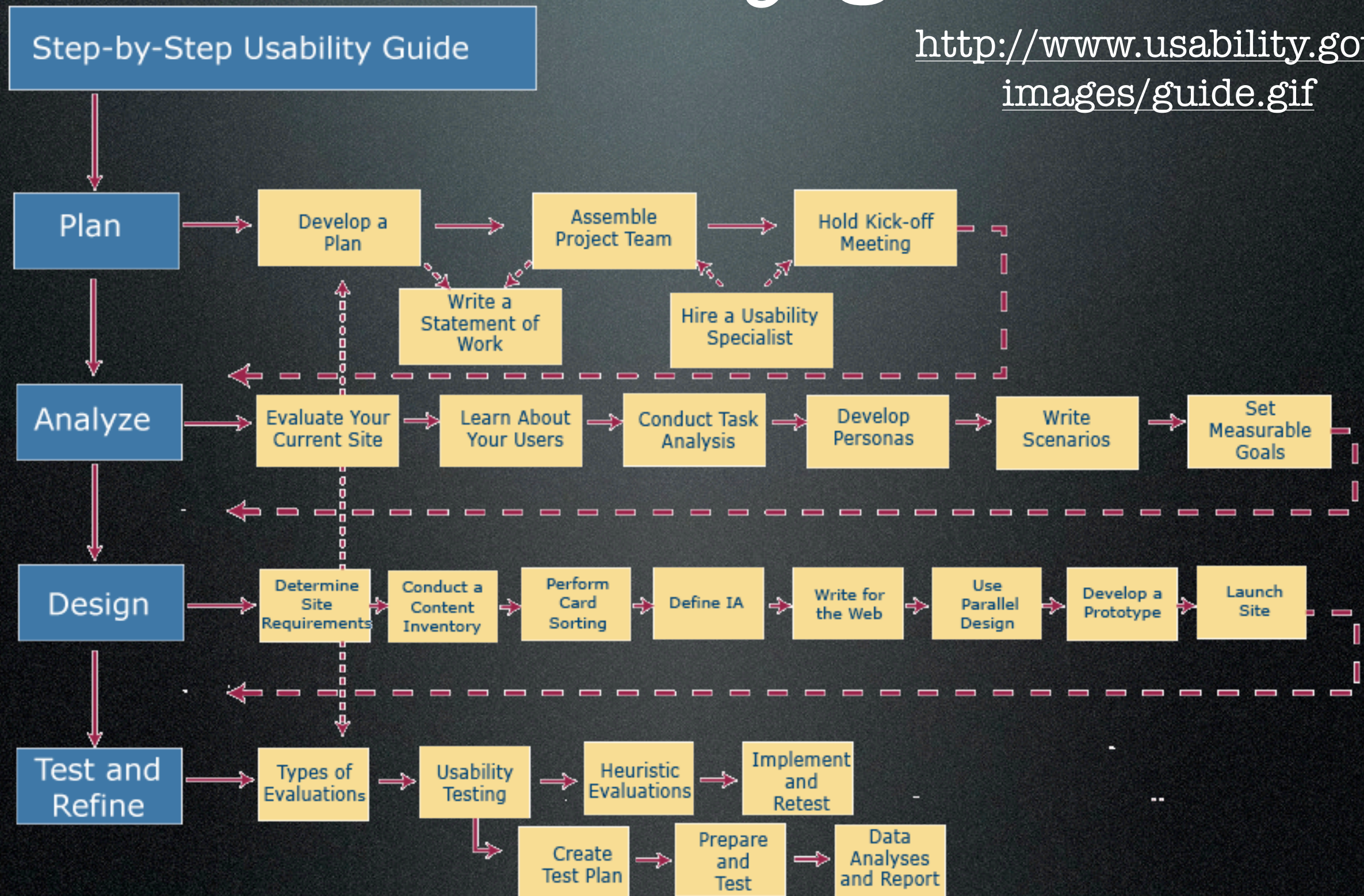


Stages	Considerations
<ol style="list-style-type: none">1. <u>Planning</u> your site2. Collecting Data from Users (<u>Analyze</u>)3. Developing prototypes (<u>Design</u>)4. Writing content5. Conducting usability <u>testing</u> with users	<ul style="list-style-type: none">• Business objectives as they relate to the website• Users - tasks & goals• Information needs of users• User expectations and experience• Hardware and software used by users

UCD Process Model

Usability.gov

<http://www.usability.gov/images/guide.gif>



UCD Process Models

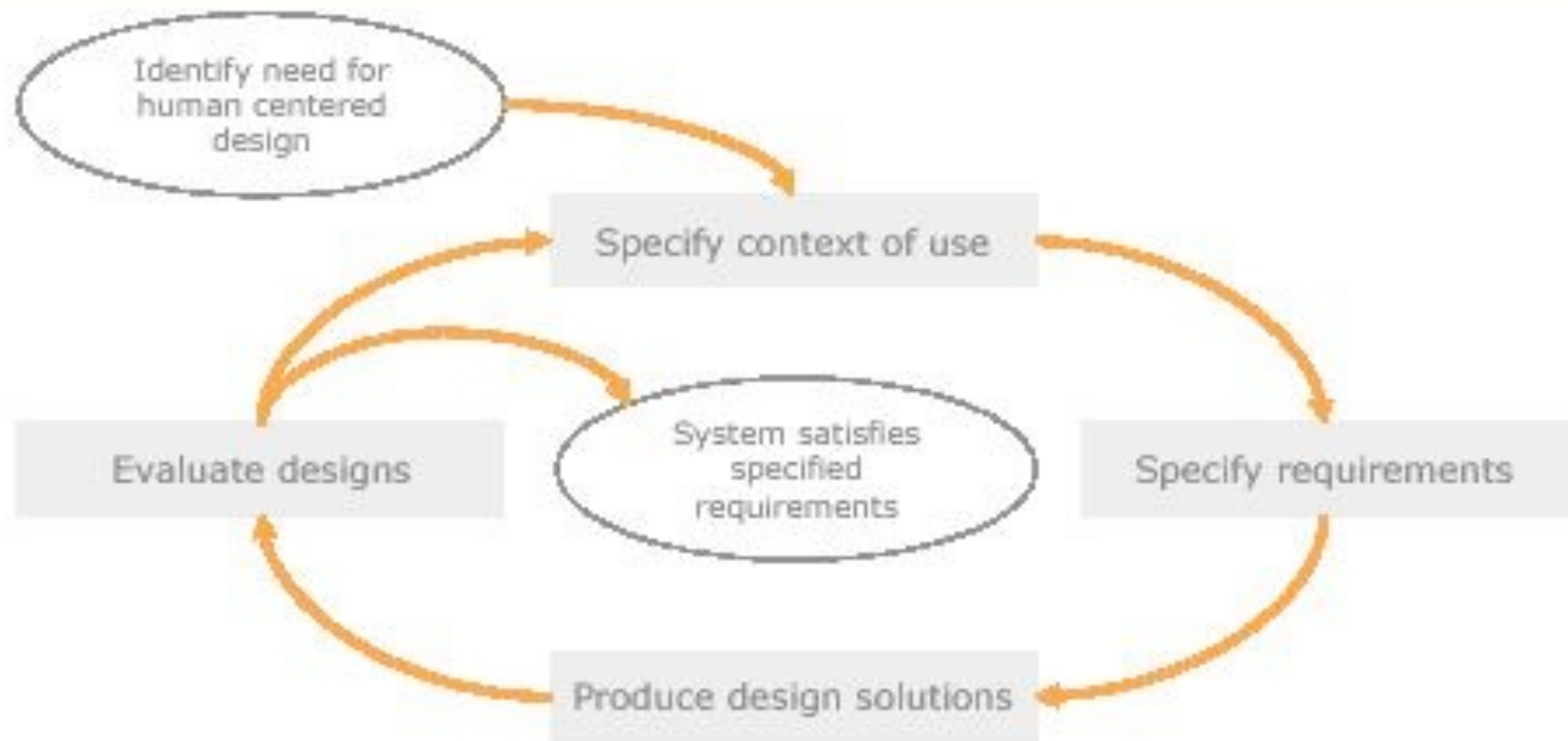
UPA



Stages	Considerations
<ol style="list-style-type: none">1. Analysis2. Design3. Implementation4. Deployment	<ul style="list-style-type: none">• Specify the context of use - user intended use and context• Specify requirements - business requirements, user goals• Create design solutions• Evaluate designs - usability testing

UCD Process Models

UPA



http://www.upassoc.org/usability_resources/about_usability/what_is_ucd.html

UCD Process Models

Usability BOK



Stages	Considerations
<ol style="list-style-type: none">1. Analysis and requirements2. Design3. Evaluation (Test & Measure)4. Implementation5. Management (Planning & Feasibility)	<ul style="list-style-type: none">• Users• Tasks• Environment• Comparatives• Project background• Business goals• Constraints

UCD Process Models

Usability BOK

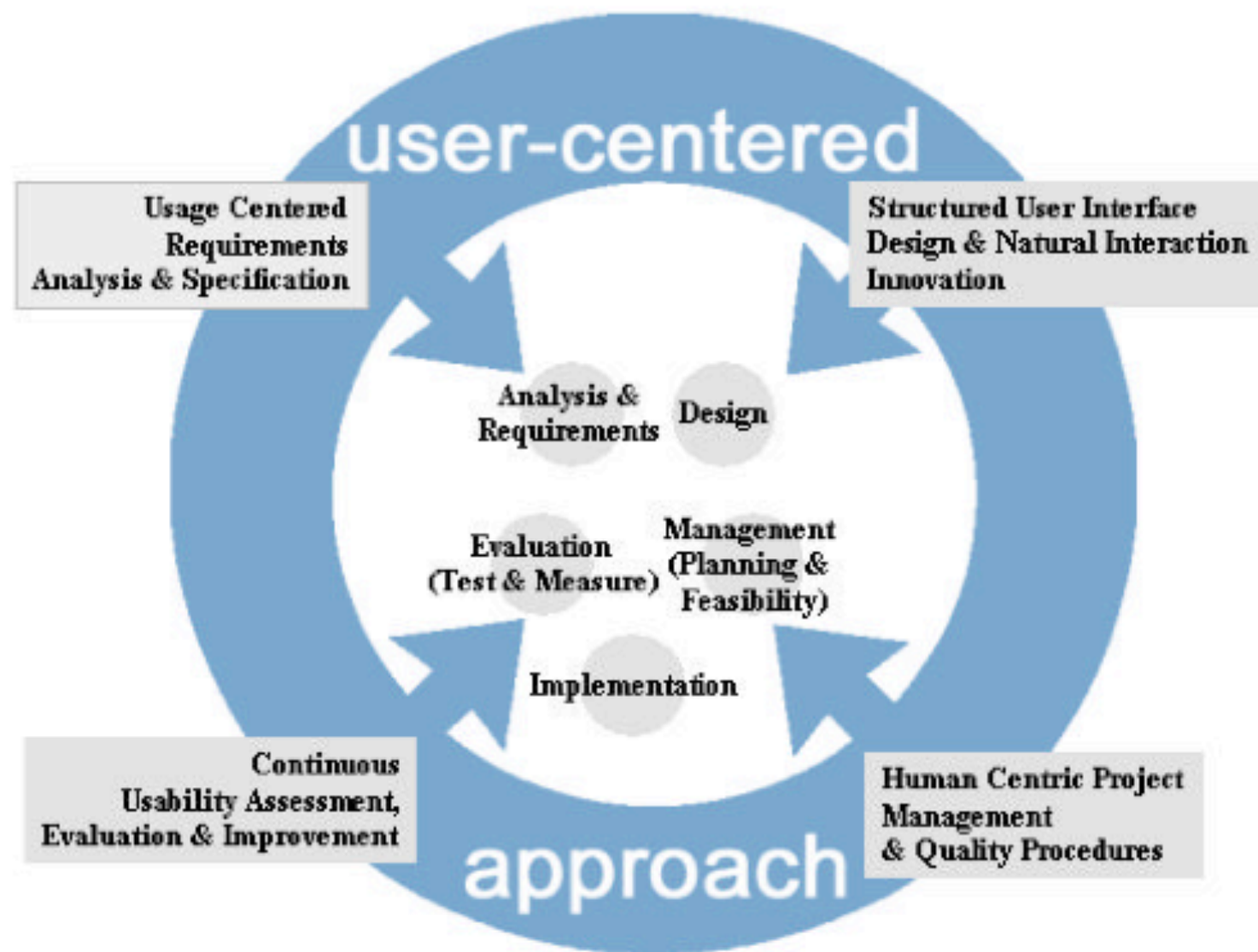


Figure 1:UCD principles and IST project activities

Bevan (2002)

UCD Process Models

Usability Planner



Stages	Considerations
<ol style="list-style-type: none">1. Concept2. Planning3. Understanding Needs4. Requirements5. Analyze Requirements6. Design / Development	<ul style="list-style-type: none">• Cost-benefits• Risks• Constraints<ul style="list-style-type: none">• Project• User• Task• Product• Context of use• Human / Resource

Usability Planner

- <http://www.usabilityplanner.org/#home>

UCD Process Models

Andrea

Stages	Considerations
<ol style="list-style-type: none">1. Explore the problem space2. Profiles, Personas, Scenarios3. Task analysis4. Design & Prototyping5. Development6. Deployment & Evaluation	<ul style="list-style-type: none">• Business factors• Process factors• UCD factors• Product factors

Explore the
Problem Space



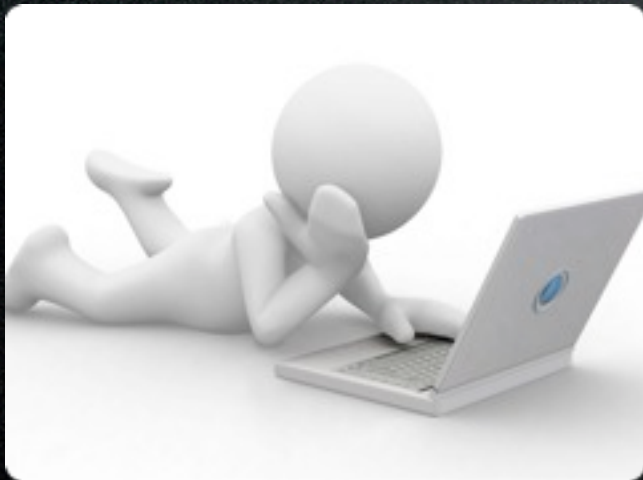
Profiles, Personas,
Scenarios



Task
Analysis



Design &
Prototyping



Development



Deployment &
Evaluation



UCD Activities



Exploring the Problem Space

- System concept/idea
- Market research
- Data log analysis
- Wants & needs analysis
- Organization climate assessment



Profiles, Personas, Scenarios

- Creating the database of users
- Capturing key data on users
- Personas - Grouping users into meaningful groups
- Contextualize



Task Analysis

- Identifying user triggers
- Understanding desired endpoints & success criteria
- Recognizing critical paths
- Contextual inquiries
- Ethnographic research



Design & Prototyping

- Testing design alternatives
- Information architecture analysis
- Low fidelity to high fidelity prototyping
- Functional testing
- Integrated workflow testing



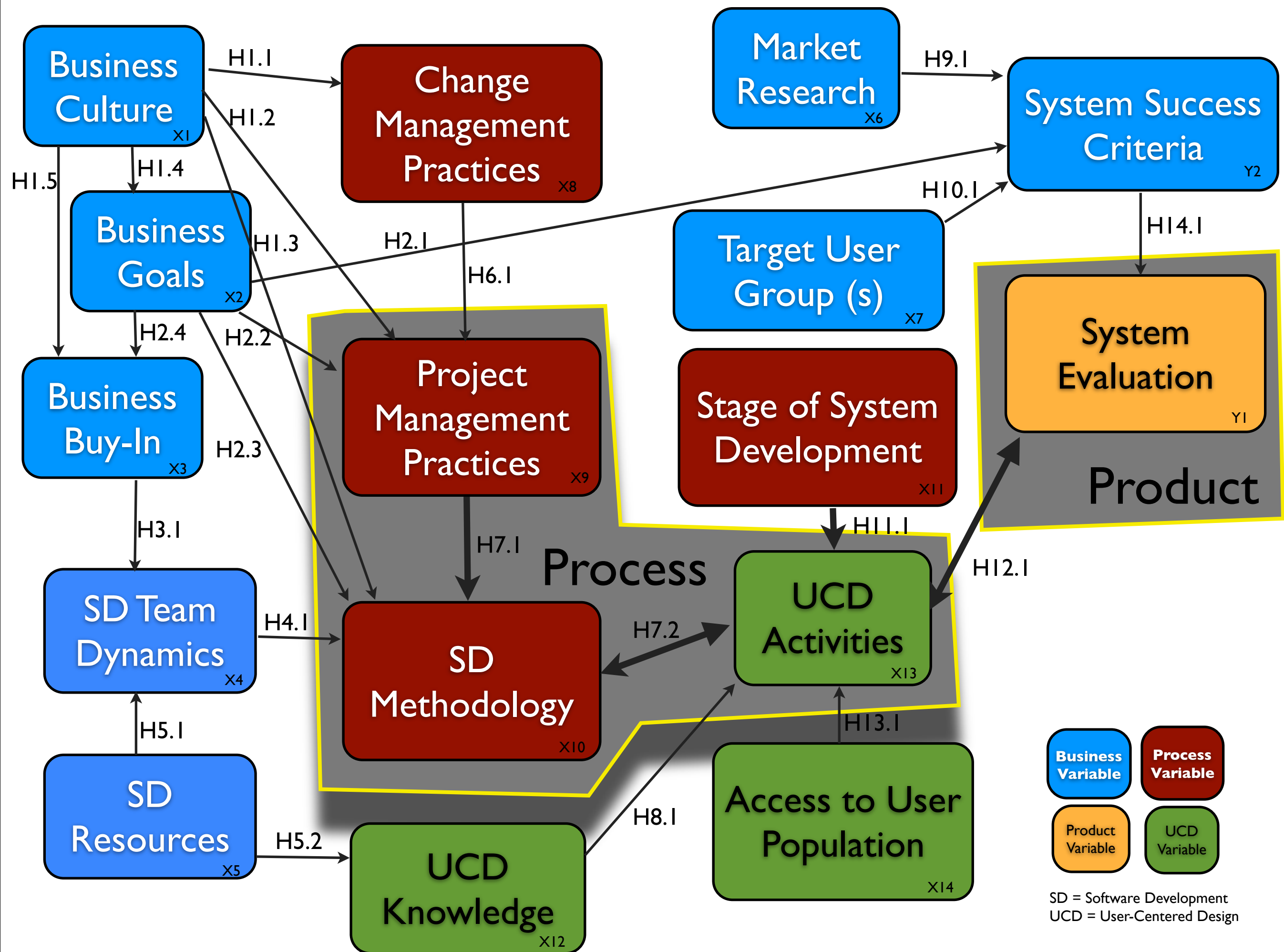
Development

- Persona campaign
- Unit testing based on personas and scenarios
- Developer and UCD team collaboration
- Field tests of personas

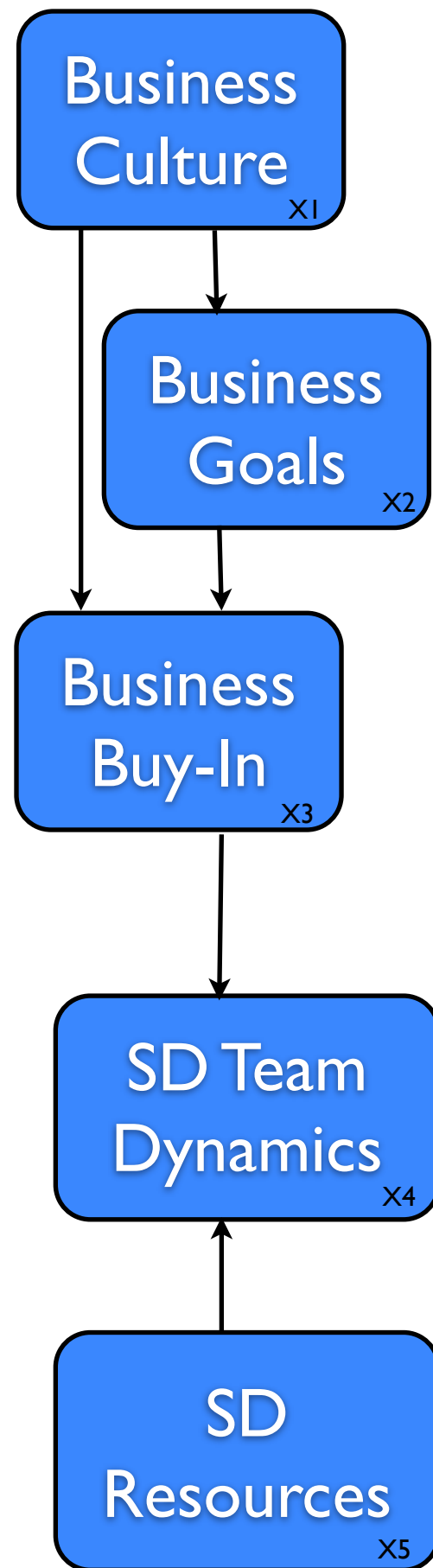


Deployment & Evaluation

- Usability testing
- Data log analysis
- User feedback
- Task analysis
- Measure ROI

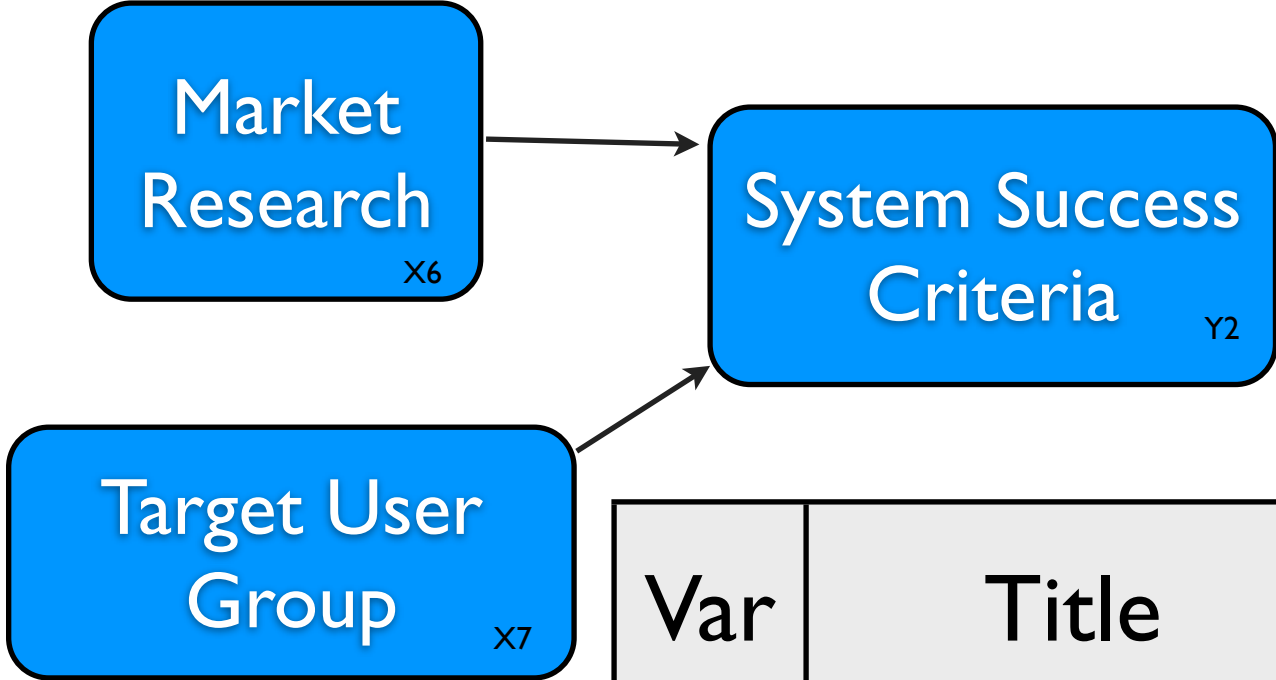


Business Factors



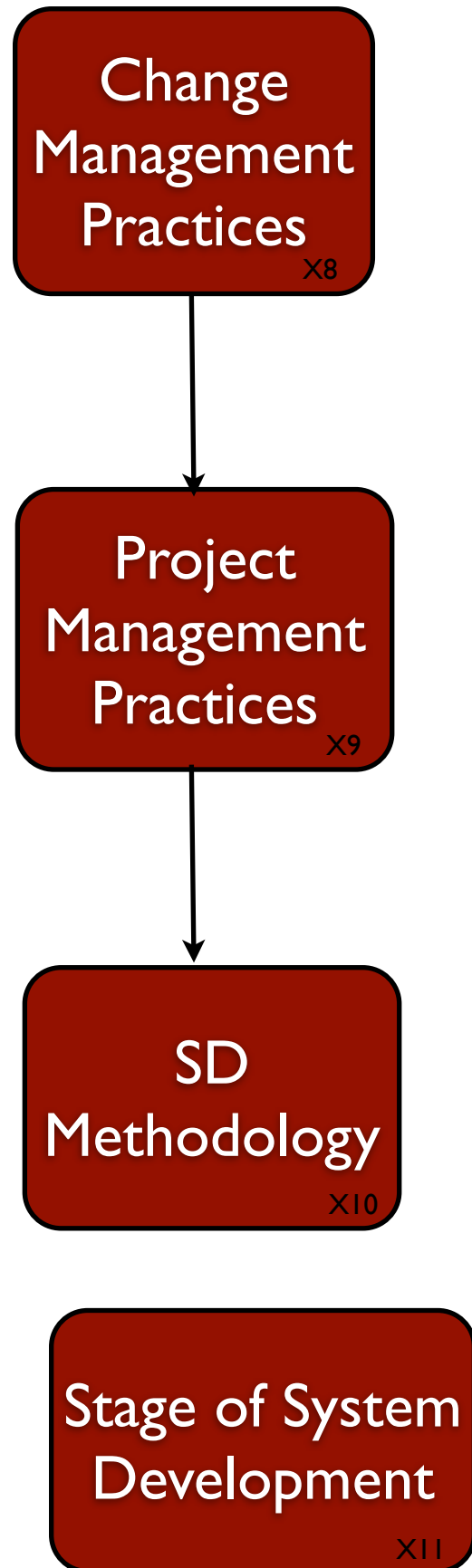
Var	Title	Definition
X1	Business Culture (BC)	An organization's absorptive capacity to implement UCD practices. Organization's user centeredness.
X2	Business Goals (BG)	High level business strategic vision and market penetration strategy.
X3	Business Buy-In (BB)	Commitment and support from organization leadership.
X4	SD Team Dynamics (TD)	Maturity of team on team dynamics continuum. User-centeredness of team.
X5	SD Resources (R)	Resources dedicated to software development to include money, people, and materials.

Business Factors



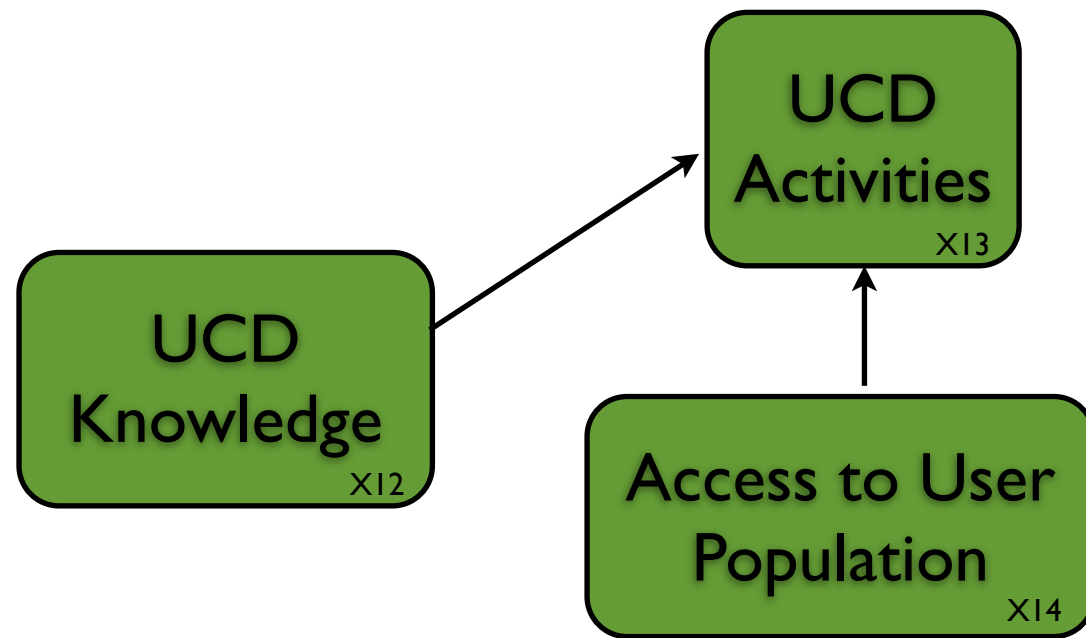
Var	Title	Definition
X6	Market Research (MR)	Identified market opportunities and strategies to penetrate the target population of users.
X7	Target User Group (UG)	The identified target population of users based on market research and business strategy. A prioritized list of stakeholders and end-users.
Y2	System Success Criteria (SS)	Measurable return on investment goals for the product, business and brand. Desired process improvement measures.

Process Factors



Var	Title	Definition
X8	Change Management Practices (CM)	Measures both the macro (culture) and micro (process) levels of an organizations ability to change.
X9	Project Management Practices (PM)	Identifies the current project management practices according to PMP standards.
X10	SD Methodology (M)	The type of software development methodology the company uses for the given product.
X11	Stage of System Development (S)	The maturity of the product as well as the stage of development (concept to maintaining).

UCD Factors



Var	Title	Definition
X12	UCD Knowledge (K)	Organizational knowledge and previous experience with UCD activities.
X13	UCD Activities (A)	Current UCD activities being used throughout the system development process.
X14	Access to User Population (UP)	An organizations ability to physically or remotely bring users into the development process.

Product Factors

System
Evaluation

YI

Var	Title	Definition
YI	System Evaluation (SE)	User experience evaluation matched to user experience goals. System performance.

You Decide

- What is User-Centered Design to you?

Need ideas...visit the UX Lab site

<http://uxlab.hci.iastate.edu/>



Good Usability
does not
a Good
user experience
make

Take Home

- Know where you are in the HCI world
- Establish your definition of UCD
- Follow a UCD process (make your hybrid)
- Focus on user experience

ISU HCI UX Lab

uxlab.hci.iastate.edu

Book the lab

Back Up Slides

Cost Justifying UCD

- ROI of UCD
- Cost-benefits of UCD
- Measuring UCD
- Linking UCD to ROI

Cost Justifying UCD

- HFI Animation
 - The ROI of User Experience with Dr. Susan Weinschenk
 - <http://www.youtube.com/watch?v=094kYyzqvTc&feature=related>

Cost Justifying UCD

- Calculating cost-benefits
 - Development
 - Sales
 - Use
 - Support

Beven (2005)

<http://www.usabilitynet.org/trump/methods/integration/costbenefits.htm>

Cost Justifying UCD

The cost of NOT using UCD

- Rule of thumb: "Once a system is in development, correcting a problem costs 10 times as much as fixing the same problem in design. If the system has been released, it costs 100 times as much relative to fixing in design" (Gilb, 1988; IBM, 2001).
- "It is common for usability efforts to result in a hundred percent or more increase in traffic or sales" (Nielsen, 1999a)

Bias (2005)

Cost Justifying UCD

The cost of NOT using UCD

- "80% of software life cycle costs occur during the maintenance phase and were associated with 'unmet or unforeseen' user requirements and other usability problems" (Nielsen, 1993).

Bias (2005)

Cost Justifying UCD

Misalignment

- "The average user interface has 40 flaws (this is a low estimate for web sites). Correcting the easiest 20 of these yields an average improvement in usability of 50%. The big win, however, occurs when usability is factored in from the beginning. This can yield efficiency improvement of over 700%" (Landauer, 1995).

Bias (2005)

Cost Justifying UCD

Balance

- "You can increase your sales on your site as much as 225% by providing sufficient product information to you customers as the right time" (User Interface Engineering, 2001).

Bias (2005)

Cost Justifying UCD

- Resources
 - “Cost-Justifying Usability” by Bias
 - Bevan (2005) Case Study
 - http://www.usabilitynet.org/papers/Cost_benefits_evidence.pdf

Cost Justifying UCD

Andrea Guidelines

- Business goals
- Brand goals
- User experience goals
- Important differentiators
- Value propositions
- Who, Where, What, When, Why

Courage & Baxter (2005)

Cost Justifying UCD You Decide

- Do you have challenges in cost justifying?
- What measures are important in your context?

UCD According to ISO

- TC 159/SC 4 - Ergonomics of human-system interaction
 - ISO 9241-230 (ISO TR 16982) - Usability methods supporting human-centered design
 - ISO 13407 - Guidance on software accessibility

Nigel Bevan (2009)

UCD According to ISO

- TC 159/SC 4 - Ergonomics of human-system interaction
 - ISO TR 18529 - Human-centered lifecycle process descriptions
 - ISO 18152 - Specification for the process assessment of human-system issues

Nigel Bevan (2009)

UCD According to ISO

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Nigel Bevan (2009)

UCD History

- Jobs in industry
 - Human Factors Specialist
 - Usability Engineers
 - User Experience Specialist
 - User-Centered Design Specialist
 - Human-Centered Design Specialist

Reporting UCD Findings

- Story time

Reporting UCD Findings

- Usability.gov - short form and long form
- <http://www.stcsig.org/usability/resources/toolkit/toolkit.html>
- <http://www.useit.com/alertbox/20050425.html>

Usability vs UX

- UX and UI - Chicken and the Egg
 - <http://www.youtube.com/watch?v=2wZUTe7Ow1Y&feature=related>