



User needs analysis – a precondition for validation planning

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Overview

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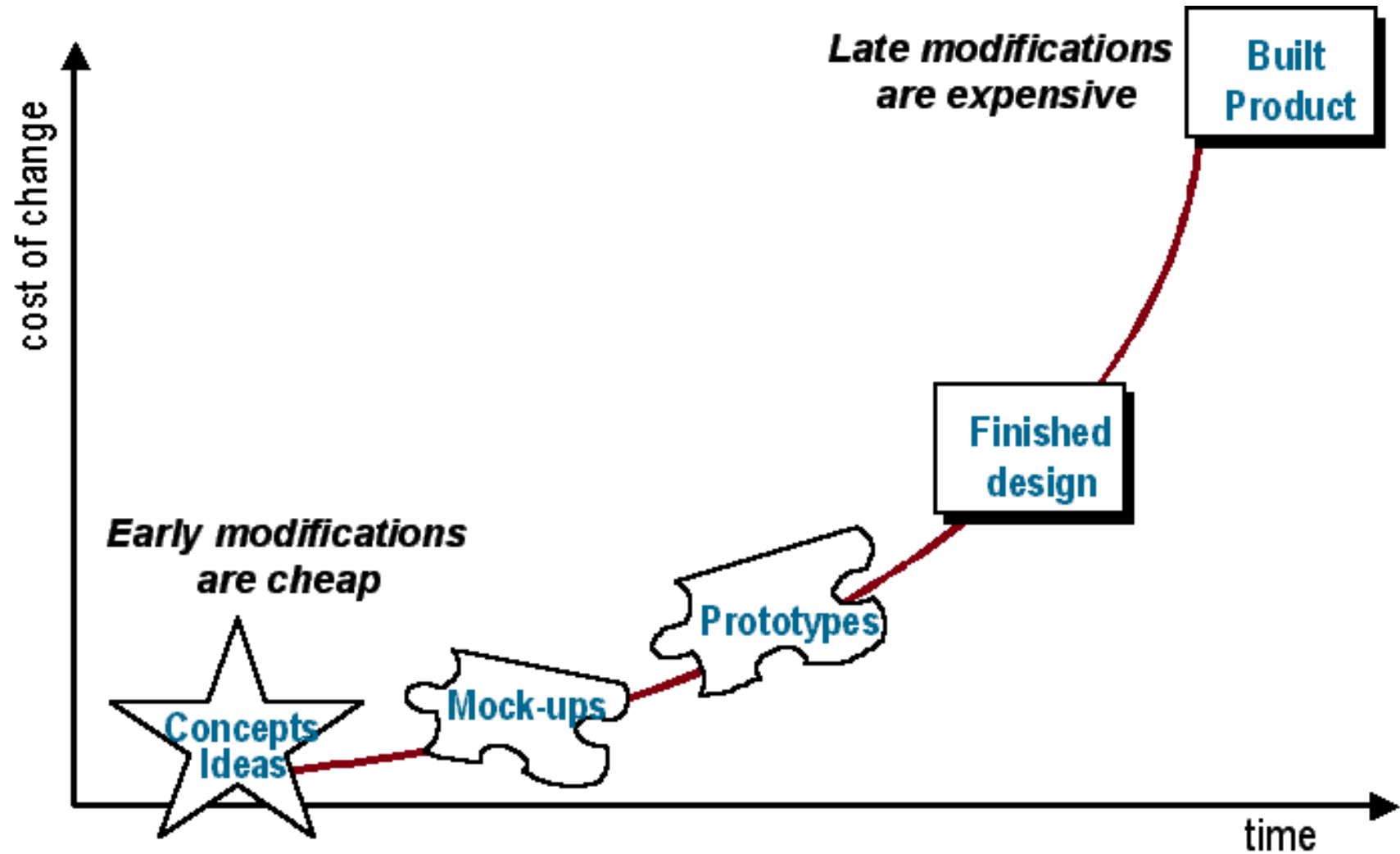


Introduction

- The bottleneck of technology oriented enterprises
- in the past: to deliver products in time and with sufficient quality
- now: to face strong competition on the basis of price and quality
- → **Develop products and services that meet the expectations of users and customers**



Early feedback is more valuable





- **Focus on users' perspectives, needs and requirements, goals**
- **Iterations of design → test & evaluation → re-design cycles**
 - **Coupling of design and evaluation**
 - **Validation of design concepts & prototypes with users**
- **Allocation of functions between computer and user (eg. minimize users' workload)**
- **Interdisciplinary design team**
 - **Domain experts (users)**
 - **Usability experts**
 - **Technology experts**
 - **Authors and editors**
 - **Media experts**
 - **Designers**
 - **etc**



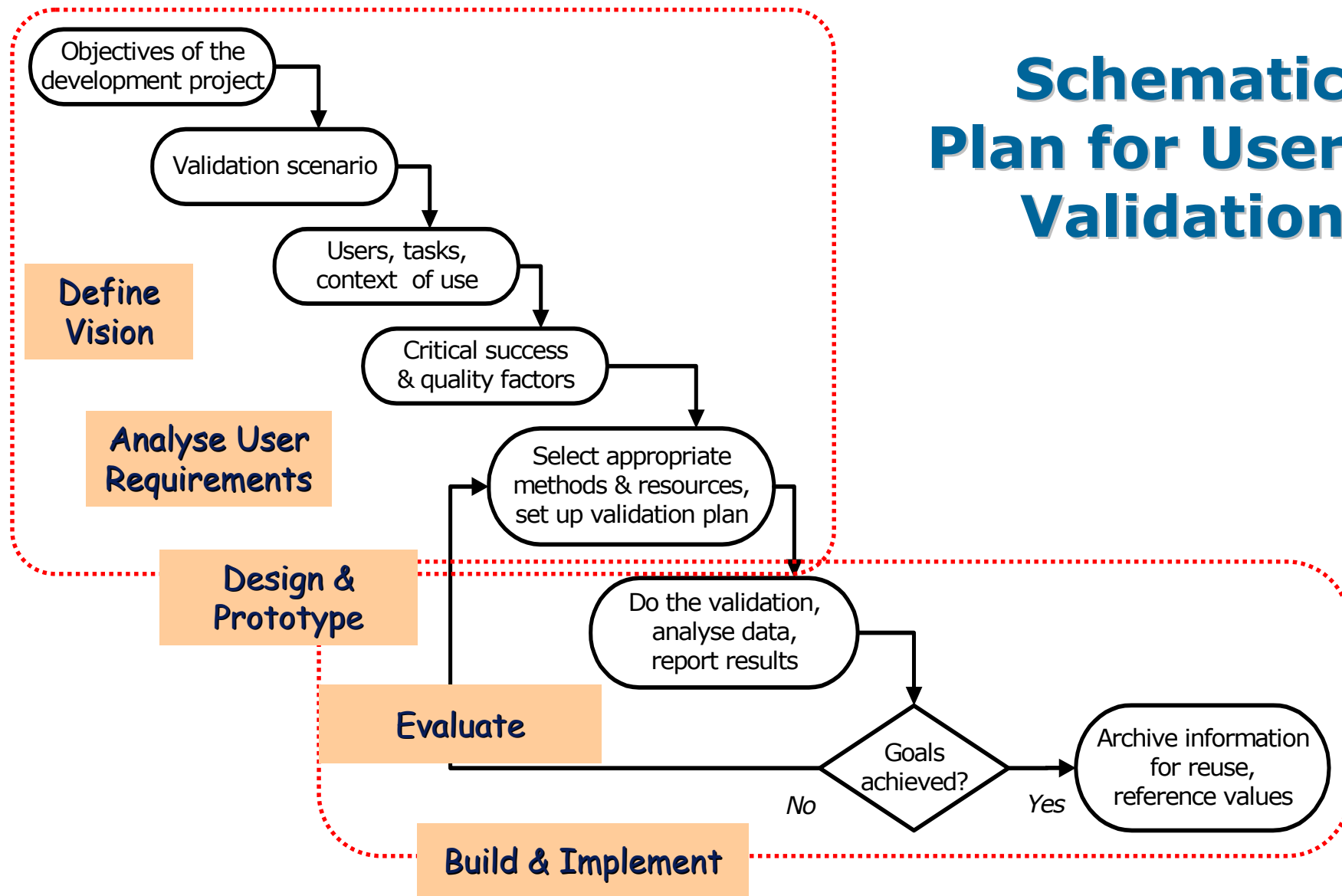
- **Diverse products and services**
 - Design, authoring and content management tools
 - Cross-media publishing tools
 - Virtual reality and personalisation tools and agents
 - Electronic information
- **Variety of users**
 - Technology users in the value chain and end users
 - Business users and individual consumers
 - 'Design for all'
- **Critical success factors and quality requirements are different for specific development projects**
- **Different methods for user-centred product creation and user validation may be appropriate**
- **VNET resources (www.vnet5.org) help with the selection of methods**



- **User validation**
 - the assessment of the quality of use of a product or service for specified users who want to achieve specific goals in a specific environment
 - the user validation process consists of planning user validation and carrying out validation activities
- **Deviations from plan cannot be predicted**
- **However, with a plan they can be controlled.**
- **Advantages of having a user validation plan**
 - evaluate the initial plan before committing yourself to it
 - simulate different ways of performing user validation and compare these, until the most effective and efficient approach is found
 - formal schedules help to identify critical factors
 - the plan is a powerful persuader in engendering a commitment amongst the project participants or the development team



Schematic Plan for User Validation





User needs analysis and related approaches

- **Traditional requirements analysis does not necessarily lead to understanding the users**
 - Systems analysis
 - Requirements-gathering sessions including a user representative on the team
 - Focus on functionality rather than usability
- **User needs analysis**
 - Focus on demands of users for content, quality, non-functional requirements and functionality
- **Market analysis**
 - Focus on demands of customers, cost / benefit
- **Benchmarking**
 - Focus on strengths and weaknesses of existing products or services competing for the same users

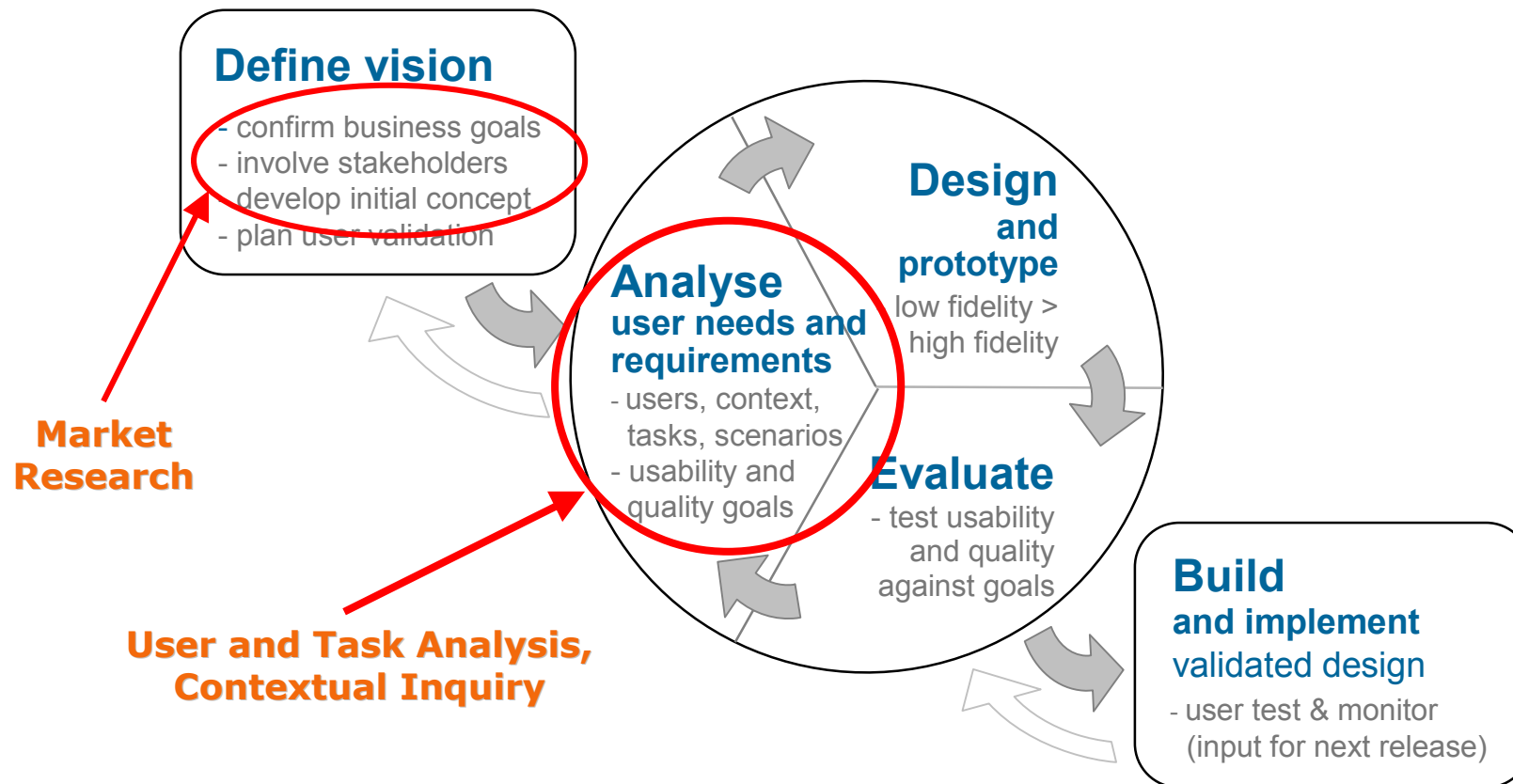


Who needs the results ? What for ?

- **Good products and services are achieved when all members in the development team understand the needs of prospective users as well as constraints of the technology**

- **Objectives of user needs analysis**
 - To provide input to user requirements specification
 - To provide input to user interface design and development
 - To identify criteria for user validation

Eliciting and analysing user needs



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Exploit results from market research

- **Use results from market research for relevant information about user needs & preferences**
 - demand for functions; customer preferences
 - acceptable prices and thresholds; purchasing behaviour
 - demographic aspects
- **Marketing provides the link between product creation and customers**
 - initial requirements elicitation
- **Marketing department may have information about real users which can be used to recruit users for:**
 - user requirements analysis
 - user-centred design
 - test and validation



Benchmarking

- **Principle: To measure and compare performance parameters, strengths and weaknesses of existing products competing for the same users**
 - traditional information products
 - currently available electronic information products and services
 - all representative applications which are considered a major competition
- **Benchmarking results set goals for design**
 - Baseline
 - Indications for where better solutions may be needed
- **Time consuming and costly**



Types of user requirements

- **Functional requirements**

- Goals users want to reach and tasks they want to perform
- Information needs
- Modes of access to information
- Transactions, modifications, delivery

- **Non-functional requirements**

- Aesthetics and branding of product
- Characteristics of users
- Context of use, environment
- New business and payment models, cost
- Legal issues, intellectual property rights
- Security, privacy
- Trust and safety
- Personalisation, customisation



- **Who will use the service / product ?**
 - end users, users of technology, other stakeholders
 - identify relevant characteristics of prospective users
 - special needs of users (“design for all”)
- **Who will make the purchase decision ?**
 - customers may not use the service / product
- **What will they use it for?**
 - identify the goals and tasks users want to achieve
 - scenarios, workflows, use cases
 - tasks vs procedures, task frequency, sequential/parallel execution
- **Where will they use it ?**
 - at the workplace, in public places, at home, ...
 - noisy environment, lighting conditions, ...
 - hw / sw platform



User analysis

- **Identify user profiles: specific descriptions of relevant characteristics of the intended user population**
 - Consider users and other stakeholders
 - Application proficiency; IT knowledge
 - (Task) Domain knowledge and experience
 - Education
 - Special needs

- **User Profiles can be determined empirically**
 - Establish agreement about high priority users

- **Methods for user analysis**
 - Checklists, questionnaires, observation, interview, focus group analysis



Task analysis

- **Distinction between tasks and activities is crucial**
 - Tasks: goals the user wants to achieve
 - Activities: user procedures (eg command sequences)
 - Using descriptions of action sequences for the design of innovative products or services is often misleading.
- **Tasks analysis involves understanding and abstraction of:**
 - Why does the user perform certain activities ?
 - Current workflow and collaboration with other individuals
 - What are the constraints and user preferences ?
 - Trade-offs between different products or services (time vs cost)
- **Methods for task analysis**
 - Hierarchical Task Analysis (HTA); Task Analysis for Error Identification (TAFEI); Scenarios, Use Cases



What to ask ? ... results may comprise ...

- Why ... ? ... to understand the underlying goals
- How ... ? ... to understand the steps in carrying out tasks; process direction: input from or output to user; process discreteness: separate steps or actions
- When ... ? ... to understand what triggers the task; locus of control: user or process driven
- How often ... ? ... to identify frequent and infrequent activities; frequency of use; processing rate: transactions per interval
- What do you call that ? ... to discover terminology used
- What errors typically occur ? How do you discover and correct these errors ?
... operational risk: consequences of error or failure
- Are there any exceptions to normal procedures ? ... process variability: unpredictability or ad hoc
- What things would you most like changed ?
- Do you have any specific ideas for design / improvement ?



Concrete vs abstract results

- **Scenarios are concrete, specific, but “typical” or representative descriptions**

Michael Williams connects to the internet, keys the URL “www.vnet5.org”, clicks to „members login“, gets “enter user id and password” prompt and keys “micky” and “vnet5x”

- **Generic use cases describe generic scenarios, specific interaction with a given user interface**

VNET5 member keys URL, selects login link, reads prompt, keys ID and password

- **Generalised use cases describe abstract interaction**

Request VNET5 support, identify self, access information



Context of use analysis

- **Physical constraints**
 - Location / portability
 - Ambient noise
 - Lighting
 - Vibration
 - Contaminants
- **Interface device constraints**
 - Limitations or constraints in input and display hardware
 - Keypad limits
 - Screen size and resolution; monochrome display
 - Platform
- **Methods**
 - Checklists, questionnaires



Overview of useful methods

Informal approaches

- Observation
- Interview
- Document analysis
- Focus group techniques
- Questionnaires
- Checklists (e.g. for context of use)
- Story boarding
- Paper prototyping
- Scenario requirements analysis (SCRAM)
- Server log analysis

Formal approaches

- Hierarchical Task Analysis (HTA)
- Task Analysis for Error Identification (TAFEI)
- Use Cases
- Positioning / Customer analysis
- Contextual analysis & design (ethnographic approach)



Effectiveness of requirements analysis

- **Effectiveness depends on the type of project**
- **Consumer products**
 - Consumers have no real understanding of the innovative product or service
 - They find it difficult to predict and express their needs
 - Creativity of designers is required
 - Much effort is required with high risk of failure
- **Professional applications**
 - Professionals are available for thorough task & work flow analysis
- **Safety critical applications**
 - Precise definition of tasks and procedures before building new tools
- **Administration and governments**
 - Standards are of importance; determine minimum requirements
- **Mobile applications**



Conclusions

- **User needs analysis is an error prone part of the development process**
(people don't really know what they want until they try it!)
- **User needs not elicited at an early stage in the development process may lead to expensive failures of products or services later**

→ **Verify user needs with design solutions and prototypes**