UsabilityNet Methods for User Centred Design

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Abstract

There is a wide variety of conflicting guidance available on appropriate methods to use to support user centred design. The ISO 13407 standard provides a framework for applying user centred design, without stipulating which methods should be used. Based on wide experience of EC and commercial projects, the TRUMP and UsabilityNet projects selected sets of methods to support ISO 13407 that have been found to be cost-effective in commercial application. The paper compares these methods with those found in textbooks, and discusses the most effective way to present them through a web site.

1   User centred design process: ISO 13407

ISO 13407 provides guidance on achieving usability by incorporating user centred design activities throughout the life cycle of interactive computer-based systems. It describes user centred design as a multi-disciplinary activity.

The standard describes four user centred design activities that need to start at the earliest stages of a project. These are to:

- understand and specify the context of use

- specify the user and organisational requirements

- produce design solutions

- evaluate designs against requirements.

The iterative nature of these activities is illustrated in Figure 1.

The process involves iterating until the objectives are satisfied. ISO 13407 describes the basic principles, but does not stipulate specific methods. The sequence in which the activities are performed and the level of effort and detail that is appropriate varies depending on the design environment and the stage of the design process.
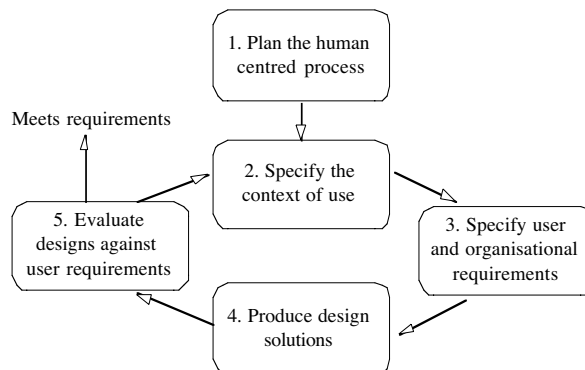

Figure 1: ISO 13407 activities

2   TRUMP

The EC-funded TRUMP project (Bevan et al, 2000) trialled use of user centred design methods based on ISO 13407 in two contrasting application areas: office applications in the Inland Revenue/EDS, and avionics systems in Israel Aircraft Industries. The methods used were selected to be simple to plan and apply, and easy to learn by development teams. From the common experience of these trials, 10 methods were selected as generally applicable across a wide range of development environments. Figure 2 shows how each of the recommended methods relates to the lifecycle stages and the processes described in ISO 13407.

Figure 2: TRUMP methods

1. Stakeholder meeting A half-day meeting to identify and agree on the role of usability, broadly identifying the intended context of use and usability goals, and how these relate to the business objectives and success criteria for the system.

2. Context of use A half-day workshop to collect and agree detailed information about the intended users, their tasks, and the technical and environmental constraints.

3. Scenarios of use A half day workshop to document examples of how users are expected carry out key tasks in a specified contexts, to provide an input to design and a basis for usability testing.

4. Evaluate an existing system Evaluate an earlier version or competitor system to identify usability problems and obtain measures of usability as an input to usability requirements.

5. Usability requirements A half-day workshop to establish usability requirements for the user groups and tasks identified in the context of use analysis and in the scenarios.

6. Paper prototyping Evaluation by users of quick low fidelity prototypes (using paper or other materials) to clarify requirements and enable draft designs to be rapidly simulated and tested.

7. Style guide Identify, document and adhere to industry, corporate or project conventions for screen and page design.

8. Evaluation of machine prototypes Informal usability testing with 3-5 representative users carrying out key tasks to provide rapid feedback on the usability of prototypes.

9. Usability testing Formal usability testing with at least 8 users carrying out key tasks to identify any remaining usability problems and evaluate whether usability objectives have been achieved.

10. Collect feedback from users Collect information from sources such as usability surveys, help lines and support services to identify any problems that should be fixed in future versions.

3   UsabilityNet

One of the objectives of the EC UsabilityNet project (Bevan et al 2002) has been to provide usability professionals with an authoritative website of resources, including recommended methods for user centred design. UsabilityNet partners reviewed a wide range of methods, and based on the partners' experience in EC and commercial projects, 35 methods was selected that had a track record of cost-effective application in a commercial environment. These were categorised into the same stages of the development process as in TRUMP, except that testing and measuring was identified as a separate activity at the end of implementation. To help users select appropriate methods, they are represented on the web site in a table with a column for each stage of the development process (Figure 3).

A description of the method can be obtained by clicking the appropriate cell. The methods can also be filtered based on three criteria: limited time or resources, no direct access to users or limited skills or expertise. Inappropriate methods are greyed out depending on the criteria selected. With all filters applied, eight remaining basic early lifecycle methods are recommended (see Table 1).

Preliminary evaluation has shown this to be a good learning tool, but some users find the complexity of the interface intimidating by comparison with the simpler TRUMP approach, so other forms of representation are being explored.

Methods table

you can select the most appropriate methods depending on three conditions

☐ limited time/resources   ☐ No direct access to users   ☐ Limited skills/expertise

Planning & Feasibility	Requirements	Design	Implementation	Test & Measure	Post Release
Getting started	User Surveys	Design guidelines	Style guides	Diagnostic evaluation	Post release testing
Stakeholder meeting	Interviews	Paper prototyping	Rapid prototyping	Performance testing	Subjective assessment
Analyse content	Contextual inquiry	Heuristic evaluation		Subjective evaluation	User surveys
ISO 13407	User Observation	Parallel design		Heuristic evaluation	Remote evaluation
Planning	Context	Storyboarding		Critical Incidence Technique	
Competitor Analysis	Focus Groups	Evaluate prototype		Pleasure	
	Brainstorming	Wizard of Oz			
	Evaluting existing systems	Interface design patterns			
	Card Sorting				
	Affinity diagramming				
	Scenarios of use				
	Task Anaysis				
	Requirements meeting				

Figure 3: UsabilityNet methods

Method	UN	Nielsen	Mayhew	Vred.
Planning & feasibility				
Stakeholder meeting	√			
Planning	√	√	√	√
Cost benefit analysis	√	√	√	√
Competitor analysis	√	√		
Requirements				
User survey questionnaire	√		√	
Interviews	√	√	√	
Contextual inquiry/interview	√		√	√
User observation/field study	√	√	√	
Analyse context of use	√	√	√	√
Focus group (requirements)	√	√		
Brainstorming	√			
Evaluate existing system	√			√
Card sorting	√	√		√
Affinity diagramming	√		√	√
Scenarios of use/use cases	√	√	√	√
Task analysis (analytical)	√	√		√
Set usability goals	√	√	√	√
Design patterns	√			
Design				
Design guidelines	√	√	√	
Paper prototyping	√	√	√	√
Heuristic/expert evaluation	√	√	√	√
Parallel design	√	√		
Storyboarding	√			
Evaluate prototype	√	√	√	√
Wizard of Oz	√			
Conceptual models			√	
Participatory design		√	√	
Design walkthrough				√
Implementation				
Style guides	√	√	√	
Test & Measure				
Diagnostic evaluation	√	√	√	√
Performance testing	√	√	√	√
Subjective evaluation	√	√		√
Critical Incident Technique	√	√		
Pleasure	√			
Post-release				
Testing and measurement	√	√		√
Subjective assessment	√	√	√	
User survey questionnaire	√	√	√	√
Remote evaluation	√			
Logging		√		
Field study		√	√	

Table 1: Recommended methods

Key
UN: UsabilityNet
Nielsen: Nielsen (1993)
Mayhew: Mayhew (1999)
Vred.: Vredenburg et al (2002)

√: described
√: mentioned

√ : basic or recommended

Note
The methods listed in the table exclude general advice and duplications

4 Comparison

The methods recommended by UsabilityNet have been compared with those recommended in three textbooks (Table 1). UsabilityNet (2002) recommends 35 methods, of which seven are core methods. Nielsen (1993) describes 24 methods (and mentions four more), of which five are rated as having the biggest impact on usability. Mayhew (1999) describes 18 of the methods and mentions four more, Vredenburg et al (2002) describe 18 and mention 2 more.

The difference in methods recommended by different sources can partly be explained by implicit assumptions about the development environment in which user centred design is expected to be applied. More guidance is needed on the appropriateness of the methods in different contexts of use. For example:

- Consultancy: The *stakeholder meeting* is an essential activity for consultancies (and in-house usability groups that act in consultancy mode) to establish which usability methods will support the particular business and marketing priorities.
- In-house development: *Participatory design* is much easier to achieve when a system is developed for in-house users.
- Web development: Some techniques such as *card sorting* are particularly appropriate when developing web sites.

Some other methods are only required in specialised circumstances, for example *focus groups*, *brainstorming*, *parallel design*, *storyboarding*, *wizard of oz*, *remote evaluation* and *logging*. Other methods are relatively new, and not yet widely adopted, such as: *design patterns*, *affinity diagramming*, *critical incident technique* and *pleasure*.

Most surprising is the low profile of *questionnaires* and *subjective assessment*. This seems to reflect the opinion prevalent in some American organisations that what matters is whether a user can achieve a task, rather than the user's attitude to the product. However the priorities in industry are changing with a greater appreciation of the importance of user satisfaction for web sites and consumer technology, and growing emphasis not only on preference but also on engagement and *pleasure* (Green and Jordan 2002).

Another noticeable difference between UsabilityNet and the other sources is the terminology used by UsabilityNet, derived from ISO 9241-11 and ISO 13407, where usability is defined as: the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. This highlights the importance of satisfaction, and uses the term *context of use* to refer to the users, tasks and environments of use. The term context of use is gaining acceptance in Europe, but in the USA the terms user analysis and task analysis are more commonly used.

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