

# Usability Engineering Usability Testing

Usability determines to a major extent the success of products and services that are based on Information and Communication Technology. The Usability Engineering group (UE) develops and applies guidelines, methods and user interface concepts that guide the software development process to improve the task support, accessibility and ease of interaction.

Usability testing is an important instrument for systematically addressing the user and usage perspective during system (re)development. The UE group applies generic and customised methods, tools and facilities to apply cost-effective tests of software and services (web-sites, mobile services, desktop applications) in different development stages. More information on the UE approach on interface design can be found in the flyer "Usability Engineering - The Design Process".

### Methods

#### Expert review

An expert review is performed by two usability experts and can last for up to five days. The review starts with a client interview in which the following background information is established: technological and business constraints, industry practices, brand imperatives, stakeholder objectives and target user group(s). The next step is to construct a number of realistic usage scenarios in co-operation with the client. Finally, the experts assess the software based on the background information, the usage scenarios, and current guidelines and conventions.

#### User Walkthrough

The user walkthrough starts with a limited expert review (including client interview and usage scenario construction) as a result of which usability bottlenecks and points of interest are determined. Subsequently, three to six users are invited to perform the scenarios. During each session the user's performance and behaviour is monitored by one or two usability experts. A user walkthrough might also include a more interactive form of exploration of the software together with the usability expert to generate possible improvements and additions.

#### Deliverable of the expert review:

- Description and justification of the expert review method and used guidelines.
- Review of and commentary on usability issues (such as site navigation, menu structures, and search and order mechanisms).
- Table with current usability bottlenecks and limited recommendations for improvement.

#### Deliverable of the user walkthrough:

- Description and justification of the user walkthrough method.
- Review of and commentary on usability issues (such as site navigation, menu structures, and search and order mechanisms)
- Description of the user performance and behaviour during interaction.
- Table with prioritised usability bottlenecks and recommendations for improvement.



**Usability Engineering provides user interface design and usability testing services to help clients integrating human factors into their system development process.**



### Usability test

The usability test starts with a limited expert review (including client interview and usage scenario definition) as a result of which usability bottlenecks and points of interest are determined. Next, ten or more users are invited to perform the defined scenarios. During scenario performance the users performance and behaviour is monitored and measured by one or two usability experts. Subjective measures are assessed by means of questionnaires. This type of test is the most extensive form of usability testing which enables an in-depth analysis of software usage (user behaviour and experience) and determination of usability in terms of effectiveness, efficiency, satisfaction and learnability.

### Tools

A number of tools are available for the design, execution and analysis of a test. The software package "Observer" is applied for video analysis, and the test tool 'TIATO' for task and question provision, and logging of interaction. TIATO can also be used for remote testing of Web-usability (i.e. testing via Internet). In addition, the lab is equipped with an eye-tracking device and tools for measuring mental load. Dedicated software packages are used for statistical analysis of the test results. In specific research projects, customised solutions are developed for the simulation of interaction, and for user-behaviour logging.

### Facilities

The TNO-HF Usability lab offers a flexible number of rooms which can be arranged as needed (for individual or parallel software testing purposes). The rooms are connected via a computer network, and a routing system for all audio and video signals. From the observation room user behaviour is monitored and recorded via a video system. The duration of a usability test varies from several days to several weeks depending on the number of participants, the test scheme and whether or not participants are tested simultaneously.

### Deliverable of the usability test:

- Description and justification of the usability testing method.
- Overview of measured usability in terms of effectiveness, efficiency, satisfaction (including trust) and learnability.
- In-depth analysis of specific software usage taking into account user characteristics.
- Table with prioritised usability bottlenecks and recommendations for improvement.
- Suggestions for improvement of the used interaction design techniques.



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