

# Evaluating the Combination of two User-oriented Usability Evaluation Methods: Thinking-aloud and Questionnaires

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## Introduction

- **Usability Evaluation** is a popular research topic [1] and an important aspect of software engineering.
- Assessing the Usability is **more important today** than it was in the past.
- **Research Problem:** There is no method, which assesses the three major usability aspects (as they are defined in ISO 9241: effectiveness, efficiency, satisfaction) at **once**.
- We used two well known **user-oriented** Usability Evaluation methods: **Thinking-aloud** and **questionnaires**.
- Our findings were evaluated in a **case study**.

## Approach: Overview

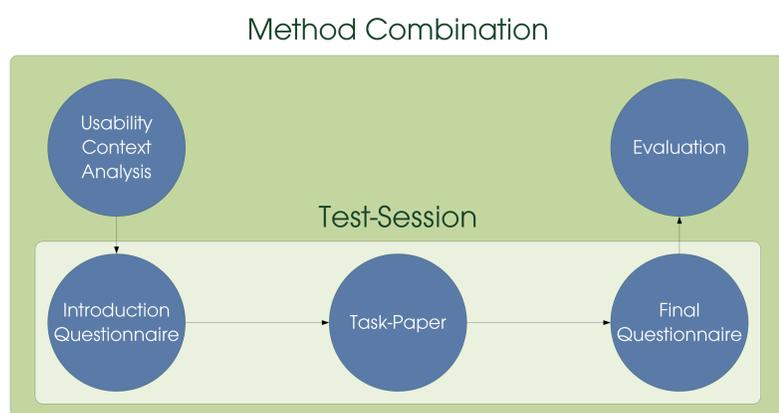


Figure 1: Overview of the used approach.

## Overview

The aim of this work was to propose a method combination for usability evaluation, which **assesses** the usability aspects effectiveness, efficiency and satisfaction as they are defined in the **ISO 9241 at once**.

**Our method combination consists of:**

- **Usability Context Analysis (UCA)**
- **Thinking-aloud**
- **Questionnaires**

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## Case Study: Overview

- **28 participants:** 20 students (target group), five researcher (target group), three professional web developers (benefit from experience)
- **Two different questionnaires:** Introduction questionnaire, System Usability Scale questionnaire (modified version [2])
- **Two different Task-Paper**
- Evaluated website: <http://swe.informatik.uni-goettingen.de>

	Approach	Results of the Case Study
Context Analysis	<ol style="list-style-type: none"><li>1 Product Characteristics</li><li>2 User groups</li><li>3 User tasks</li><li>4 Physical environment</li></ol>	<ol style="list-style-type: none"><li>1 Analysed <b>content, design</b> and <b>structure</b></li><li>2 <b>Students / researchers</b></li><li>3 Information about: <b>Lectures, projects, ...</b></li><li>4 Test-Session in <b>environment of the user</b>.</li></ol>
Introduction Questionnaire	<ol style="list-style-type: none"><li>1 Demographic questions</li><li>2 Browsing behaviour</li><li>3 Specific environment</li><li>4 Expectations and earlier visits</li></ol>	<ol style="list-style-type: none"><li>1 20 men, eight women</li><li>2 Most browsing more than <b>6h/week</b></li><li>3 Most <b>PC</b> and <b>Firefox</b></li><li>4 19 visited the website before; Expectations: <b>contact information, research topics,...</b></li></ol>
Task-Paper	<b>Problem-oriented questions</b> (based on user tasks identified in UCA) → <b>concurrent &amp; retrospective Thinking-aloud</b>	<b>Five</b> questions identical for both user groups, <b>two</b> user group specific questions
Final Questionnaire	Modified version of the <b>SUS-Questionnaire</b> : The word system was replaced by website [2].	<b>SUS-Score of 78.75 points</b> (median). Highest difference at the statement about future website usage and the integration of website functions
Evaluation	Evaluation of <b>time</b> , number of <b>clicks</b> , <b>steps</b> to reach a goal, <b>aborts</b>	Evaluation via a <b>voice recorder</b> and a <b>hand-written test-session protocol</b>

Table 1: Overview of the used approach and its application to the case study.

## Discussion & Conclusion

The results give information about the **effectiveness, efficiency** and **satisfaction** of the website.

- **Effectiveness:** Were users able to solve the tasks? Measured: **Aborts**.
- **Efficiency:** How long did it take and was the shortest way chosen? How was the psychological strain? Measured: **Time, Clicks, Comments of Users**.
- **Satisfaction:** Were the expectations fulfilled / excelled? Measured: **Comments of Users, Expectations, SUS-Score**.

**With our approach we were able to determine all three major usability aspects, as they are defined in ISO 9241 at once.**

## References

- [1] Adrian Fernandez, Emilio Insfran, and Silvia Abrahão. Usability evaluation methods for the web: A systematic mapping study. *Information and Software Technology*, 53(8):789–817, 2011.
- [2] Thomas S Tullis and Jacqueline N Stetson. A comparison of questionnaires for assessing website usability. In *Usability Professional Association Conference*, 2004.

## Further Research

Further research will include:

- **More case studies**
- **Other method combinations** - E.g. methods from another class than user-oriented evaluation methods
- **Different Questionnaires**