

Product group specific checklists for usability experts

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Introduction

Evaluating the usability of products does not always have to be a heavy procedure. A carefully designed checklist for analysing the user and task characteristics is a good practical tool for carrying out quick evaluations during designing.

What is a checklist? A list of items to be literally checked (with a checkmark) when inspecting something? No, there is more to checklists than that. A checklist presents knowledge regarding a product. Someone has defined the listed items as meaningful properties of the product. And that they are meaningful in a context — for the use of the product, and for the use of the list. Checklists can be used for:

- **Orientation:** these are important aspects of the product!
- **Guidance:** when designing, do these properly!
- **Inspection:** when done, have these been done properly?
- **Quality control:** these items are checked: It should be okay!

This paper introduces four checklists designed for expert evaluations at VTT Manufacturing Technology. The checklists have been used by experts carrying out client assignments aiming to ensure the usability of products.

Must think” — a type of checklist for experts

One may think that real experts do not need checklists, but in reality they do:

- **Experts are human.** They forget things, and work under tight schedules. A checklist can serve as a form of quality control keeping the wanted usability aspects in mind.
- **Communicating** with the client is difficult. The usability aspects need to be discussed with the designers and the requirements must be concrete.
- The **client's confidence** has to be won. What did the expert actually charge for? Are there any documents about the work?

Checklists can be divided into **”must check”** and **”must think”** lists (classification by Matti Vuori). With the **”must check”** lists every item really has to be checkmarked. These are work-intensive and, thus, widely disliked but important for quality control. For actual designing, the **”must think”** type is more useful. It presents the items in a more free form, which encourages reading and thinking, but does not require checkmarking. We will present them visually a little later.

Checklists have to be compact in order to be usable

Checklists are at best when they are short, but short lists only cover a few items. If well structured, checklists can have more items and more pages. Leaving out the lines and checkboxes makes room for **grouping the items under headings**. This **informal design** of the checklist also makes it more open-ended and encourages individual thinking.

A compact checklist has many strengths:

- It is easy to use
- It is inviting: one page gives you a general idea of the items dealt with
- It is easy to glance through before a group analysis session
- It can be pasted to the wall for group sessions
- It can be given to clients: it is not too much to digest, but it gives items to think about
- It is practicable to analysis reports
- It can be used in training as a common object, and a compact reference tool
- In a company, checklists can rapidly be tailored for internal use.
- Checklists are quick to make!

Checklists are at best only product group specific

Checklists have traditionally been build around the static features of a product, like display text sizes etc. It is obvious, that a successful usability analysis needs two dimensions:

- Checking for adherence to **good structural principles** (covering all situations of use)
- Checking for the requirements arising from the **situations where a product is used**.

Making the checklists **specific for product groups** allows them to be at the same time:

- **Concrete**: more concrete than a list of general heuristics, like "make it easy"
- **Open**: allows product concept development, since not fixed to specific design solutions
- **Versatile**: can be used for an entire product family in the company, and works in every phase of product development and design.

One important objective of "must think" checklists is to invite the person performing a usability analysis to actually simulate the use situations or even perform them. A good usability checklist must include topics to cover all tasks performed before the primary use, and all its aspects including secondary uses like maintenance.

General and product specific checklists

The "must think" type of checklists are used frequently in expert evaluations on usability at VTT Manufacturing Technology. The checklists can be classified into two groups: generic checklists and product group specific checklists. Generic checklists are used for example for evaluating the usability of product packages and user instructions. In these checklists a product group specific approach is not practical, since it would fix them to specific design solutions. However, in the checklists for the physical ergonomics of a workout device and for the usability of a welding machine's user interface, a product specific approach is fruitful.

The checklists are composed of three parts: a heading, short instructions for use, and the "must think" items. The items are based on user and task characteristics, sound ergonomic principles, and product requirements; and grouped in chapters concerning one task or feature. The general layout and the structure of the checklist is shown in Figure 1.

Checklists are based on tasks or features

The product specific checklist for the physical ergonomics of a workout device, and the checklist for usability of packages are based on tasks. In these checklists, all tasks during the whole lifespan are systematically evaluated step by step. See Figure 2.

The product specific checklist for the usability of a welding machine's user interface is grouped on the basis of features. The features concern, for example, the physical ergonomics of the machine. See Figure 3. In this case, an approach following each task would cause futile repetition.

The checklist for user instructions of machines is a general checklist mixing different aspects. The checklists incorporate common stylistic guidelines, as well as items involving the users and use, and information on the requirements in standards. See Figure 4.

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Kuntoilulaitteen fyysisen ergonomian tarkistuslista

Tarkoitettu erityisesti suuremmille laitteille, joita käytetään "laitteessa"
Kriteerit kussakin kohdassa:
* sopivuus eri käyttäjäryhmille, * sopivuus erilaisille käyttäjille (pituus, paino, ruumiinrakenne, voimat, nopeus), * sopivuus rajoitteille, * ulottuminen, * ääntäminen, * voimankäyttö, * toistolikkeet, * stereotypiat ja tottumukset, * käyttövirheet, * standardien mukaisuus

Asioiden analysoinnissa tarkastele ongelman seurauksia yleisyyttä ja tuotteen parannusehdotuksia
Kirjaukseen voi esimerkiksi käyttää Käytettävyysoanalyysin lomaketta

<p>1 Käyttöönottosuosittelu</p> <ul style="list-style-type: none"> osien sopiminen, työkalut, tukemisen tarve 	<p>9 Vaarat</p> <ul style="list-style-type: none"> osien irtaaminen, osien rikkoutuminen (mm. murtuminen, katkeaminen), takertuminen, hääpyäytyminen, vahinkokäynnistyminen, liikkuvat osat, rielut, ulkonevat osat, leikkavat osat, kompastuminen, laitteen kaatuminen, sähkövaarat, muut
<p>2 Laitteeseen asettuminen</p> <ul style="list-style-type: none"> astuminen, paikan hakeminen, istuminen, laitteesta poistuminen 	<p>10 Kunnossapito</p> <ul style="list-style-type: none"> tekniset äädit, huollot, osien vaihto
<p>3 Käynnistys / pysäytys</p> <ul style="list-style-type: none"> käynnistyskymien käyttölaiteiden siirto käyttöasentoon ja palautus käyttöasentoon 	<p>11 Laitteen siirtäminen</p> <ul style="list-style-type: none"> lartunpaikat nostoa ja kantamista varten, paino ja sen jakautuminen, laitteen vakavuus kantajien pysyminen kiinni siirrä
<p>4 Paikallaan pysyminen</p> <ul style="list-style-type: none"> tuen ottaminen, jalkojen tukeminen, istuminen tukien siirtymisen estäminen, laitteesta putoaminen, asennointi 	<p>12 Säilytys</p> <ul style="list-style-type: none"> säilytyksen valmistelu, johdot ym.
<p>5 Käyttö</p> <ul style="list-style-type: none"> voimat, voiman muutokset, nopeudet, niiden muutokset, käyttölaiteiden sijoittelu ja liikkeet, käyttölaiteiden rakenne ja toiminta, otteen, tuen pysyminen, laitteen liikkuminen, siirtyminen ja irroitus, liikkumistila, istuminen ym. mukavuus 	<p>13 Muuta</p> <ul style="list-style-type: none"> lritin tuotteen erityispiirteet, asiat, jotka eivät ole erillisen tarkastelun kohteita, jotka voidaan tarkastella erikseen
<p>6 Säätäminen</p> <ul style="list-style-type: none"> osien sijoituksen, voimien ja nopeuksien tekniset äädit 	
<p>7 Pinnat</p> <ul style="list-style-type: none"> kovuus, joustaminen, liukkaus, kitka, toimivuus kosteana (sada, hiki), lämpötilat 	
<p>8 Vaatimukset käyttäjän varusteille</p> <ul style="list-style-type: none"> vaatteet, jalkineet, käsineet, suojukset 	

Figure 1. The lay-out of the checklist for the physical ergonomics of a workout device

Checklist for the physical ergonomics of a workout device

- Assembling and setting up at home
- Stepping in the device
- Starting and stopping
- Keeping balance, staying on the device
- Operation
- Adjusting
- Maintenance
- Surfaces
- Requirements on user equipment
- Hazards
- Maintenance
- Moving the device
- Storing
- Others (specific to the device)

Checklist for usability of packages

- Packing the product
- Moving the packed product
- Transporting the packed product
- Receiving and storing the product
- Handling the packed product
- Unpacking the product.

Figure 2. The topics of two task based checklists

Checklist for the usability of a welding machine's user interface

- Physical ergonomics of entire machine
- Physical ergonomics of control devices
- Physical ergonomics of display
- Visualisation of information
- Instructions and system help
- Man-machine interaction
- Hazards and signals
- Learning how to use
- Protective clothing
- Maintenance

Figure 3. Topics of the usability checklist for the welding machine user interface

Checklist for user instructions of machines

- Using the instructions (other instructions)
- Structure of the instructions
- Intended use and misuse
- Users
- Construction of machine, and other required information in standards
- Content involving entire lifespan
- Safety information and warnings
- Protective clothing
- Explanation of tasks and procedures
- Presentation (lay-out, pictures, e.g.)

Figure 4. Items in the checklist for the user instructions of machines

Conclusions

Checklists give real benefits to the usability consultant in client assignments. Checklists serve as quality control for the expert, and help in communicating with the designers. However, expert evaluation is only a part of a usability assessment, and using checklists is only one tool for it. At least user and task analyses, and some usability testing is required almost without exception.

References

Vuori, M. (Editor), 1996, Käytettävyys II. Käytettävyys tuotekehityksessä: innovatiivisuutta ja varmistamista. Sähkö- ja elektroniikkateollisuusliitto, 104 p.

These ideas have also been presented in an article with the same name: Danska, Anna; Vuori, Matti & Toivonen, Sirra. 1997. Product group specific checklists for usability experts. 13th Triennial Congress of the International Ergonomics Association. Tampere, FI, 29 June - 4 July 1997. Vol. 2. International Ergonomics Association IEA . Helsinki. (1997), 331 - 333.