

# Interaction design, lecture 2 - Principles for Good Interaction, Kasper Hornbæk

Onsdag, 6. februar 2019

## Housekeeping

Thank you for handing in assignments, soon your TAs will grade your assignments, due to a feature on Absalon you need to hand both in Assignment and Peer Review, some of you missed that. If you didn't you should talk to your TAs. The deadline for peer feedback thursday 12. If you want to switch team, you talk with your TAs. In the tutorials there will be discussion about how to read papers. Some important pages are missing in Shneiderman & Plaisant 2004, they will be uploaded.

## Today

Some of the principles are in the readings some are not. Next week's assignment is due next Tuesday and I will run over it. The TA's will also discuss it with you in the afternoon.

## What makes interaction good?

Two worlds technical and user interfaces. Aiming for usefulness. What are all the qualities that we aim for?

## What makes software good?

Shoot at me, any ideas? Usefulness, intuitiveness, communication feedback, speed, simple structure of the user interface, capacity for new uses/customisation.

ISO 9126 standard for good software. You should have some modularity of code, don't make code that uses all memory, maintainable and commented code - that's all internal to the code. What you talked about is usability and some of the functionality. This standard was created from software quality view, part of today is to make the usability and functionality part more clear.

## Two groups of answer on goodness

One might say that there are two groups. Quality-in-use (Bevan 1995). Essentially functionality, what you can do, usefulness, "fit" between people and systems. Not focus on aesthetics, they are good if they provide useful functionality. That's one view. The other is experience-of-use. Norman calls it user experience. It emphasises other things than functionality; fun, enjoyment, engagement. It has focus on the full experience of human experience. Those are two main answers to the question of interaction design.

## Why do we need to know?

If we have fleshed out concepts of goodness, we can talk and reason about them, just like with software. They are not fluffy and vague if we want to reason. We would like to eventually measure them so that we can test them and have useful indicators of usability and other concepts.

## Why do we need to know (II)

If the terms become measurable they can be put into legal contracts. For example that people should be able to withdraw cash from ATM in average of 2 minutes or similar. You can put these aspects of usability into software development reports.

**Quality-in-use** is basically what is talked about in the Benyon 2019 - usability, accessibility, availability

### **Usability: Nielsen 1993**

Jakob Nielsen is perhaps most famous danish interaction design researcher. He made tree-like hierarchy. Social accept vs practical accept. Usefulness: Utility vs usability.

It suggest that whatever we design on usability level has influence on whether people accept the technology.

Another definition of usability is an ISO standard. It claims that there are 3 levels: 1) Effectiveness, it is sort fo about quality of outcomes, erros you make when you have a task, if the system induces error then it is not effective 2) Efficiency. Resources you need to put into the interaction, task completion time like in ATM example, 15 minutes would not be very efficient 3) Satisfaction. Attitudes of users, would user's recommend to a friend

### **Usability: Benyon's Criteria**

Mentioned in Benyon 2019. 1) Efficient 2) Effective 3) Easy-to-learn and remember 4) Safe to operate 5) High utility.

All the standards seem to converge in there similarity and shows a common core of usability.

If I take some minutes to complete a task, what in Benyon am I speaking of? Student: Utility, since you talked about being fast. Lecturer: For Benyon utility is more about whether you get the task completed.

What if I make a word-processor that gives you a higher grades from your report? Student: Utility. Lecturer: Yes, I guess I would put it under utility too. It's not clear why its not effective. Effectiveness is probably a necessary condition for high utility.

What if we ask preferences of users in assessing two similar interfaces? Students: 1, 2, 3, 4, 5. Lecturer: I don't think Benyon has any place for preferences. Benyon's is about functionality. In the ISO standard you have a place, namely satisfaction.

### **The PACT Model**

In the Benyon model there is a hint of the PACT Model. You can also think about usability as matchmaking between people, actions, contexts, technologies. Even though there is a match between people and technologies in general, the specific context might not fit; there is a breakdown.

It is important that you know these models, and you apply the knowledge in the assignments.

## **Accessibility**

Absence of exclusion in the domains of physical, conceptual, economical, cultural, social. We don't even get to assess usability if it cannot be accessed by the user.

## **Physical differences**

A simple example is physical considerations. Body shapes are different. If you design a ticket kiosk and fail to make it usable for people of different height you have made an inaccessible design. People may also be fat or pregnant.

## **Knowledge Differences**

There are definitely interfaces that are inaccessible because they use language for experts

There is an important quote from the Benyon book. If a design works well for people with disabilities, it works better for everyone, Benyon (2019, p. 105) Can anyone give an example backing up this argument? Student: If someone temporarily loses a functionality then they can still use it if it was already designed for people who has that disability? Student: Hearing aid, you have a clear communication with the person with the hearing aid. Student: If you design a webpage and you have low-contrast text it is horrible for everyone but especially for the person with bad sight. Lecturer: Yes, everyone has tried that. It is particularly hard for people who are without glasses or similarly.

## **Other reasons**

There are a lot of examples. In Denmark digital inclusion is taken seriously in Denmark in contexts of the public sector, fx NemID, Digital Post

## **Good tools for accessibility**

You can run your webpages through accessibility tools that will guide you. It is not sufficient, but it's a step.

Quality-in-use is perhaps the simple part of designing user interfaces. Let's move on to user experience.

## **Historically...**

Historically the field has focused on usability since the 80. Around 200 people criticised the utilitarian view: Aesthetics are also important. Blythe et al Funology: From Usability to Enjoyment. Why does nobody talk about fun. Does this work for interactive systems, computer systems?

Example: Paper from 200. Hedonic and ergonomic quality ... aspects determine a software's appeal. Ergonomic is more or less the same as usability, hedonic is greek it is about all the stuff that is pleasurable. Stimulated creativity. They asked people a lot of questions, they wanted to *predict* appeal. Exciting-dull, interesting-boring together with usability stuff: Predictable-unpredictable, simple-complex. What is interesting here, is that we can ask people these things. We can show that both things matter. That's why we have UX and models of UX in this course.

## **Characteristics of UX research**

Most of UX is in Norman book. Bargas-Avila & Hornbæk 2011: 1) Holistic view of interaction, that is lingo for looking for before, during and after interaction. Quality-of-use focuses only on during. We know from experimental results that all 3 are important. 2) Positive aspects of interaction 3) Situational and dynamic aspects of interaction. Kahneman is cognitive scientist. One of his most experiments: People undergo painful medical procedure. Ask people. Compare between directly vs after 5 minutes of low pain. If you had a standard ergonomic view of people then you would say that the total sum of pain is same. But people say that they expressed less pain if they had 5 minutes of low pain. That is a huge thing in economics and psychology, but even in computer systems it might matter to interaction. 4) Quality is multidimensional 4) A need for new approaches to design and evaluation. I will give you examples later about how we can measure these things.

## **User Experience Measures**

What you can actually measure if you are interested in quantifying UX. From review of how it is measured in research, but similar to real or practical. Almost all questionnaire-based. Before and after. The main dimensions is affect/emotion, aesthetics/appeal, engagement/flow. The point of all this is that there are actual questionnaires, that you can use. Benyons includes SAS questionarie.

## **Norman on experience**

In Norman there is a hint of argument that is super weird. He claims that memory is more important actuality. What he means is that user experience is everything, people's memory of usability do not matter unless people remember it. It relates to Kahneman example. Is the actuality related to the perception of actuality? People might not think the fastest software is actually the fastest. There is an ethical question: Should we just design systems that make people feel good and whether they have actual benefits or usefulness from the interaction. It don't want to start a full-blown discussion of the ethics, I just wanted to highlight it, because I don't think it is as simple as Norman makes it seem.

## **Designing for Pleasure (Jordan, 2000)**

Simple model of pleasure: Physio-pleasure - touch, aesthetics, socio-pleasure derived from being connected to other people, psychology suggests that it is important, psycho-pleasure captured in flow, overcoming challenges, ideo-pleasure derived from values and ideologies in a product - fx pleasure in open source because you like the ideology of open source.

## **Norman (2013)**

Visceral - apperance, immediate impression, aesthetics. Behavioral - look and feel, understanding, control, rational thinking about. Reflective - values in systems, what they signal to others, Apple used to be an example of social signalling, self-esteem, not about during but afterwards. Connected to basic psychological model. other words: Affective, behavioral and cognitive. It is not clear that the levels are easy to understand. Discuss with your neighbour the iPad and how it relates to the three levels.

Student: the iPad and different application are enjoyable but they reduce my attention span and it is unfavourable in the long run when I have to work. Lecturer: Some will claim that they are about hedonia. There are models that represent alternatives to pleasure, goals of user, longer timespan, longer value. There is an influential paper on designing apps to help make people what they want to be, but it is often at the expense of pleasure.

### **Principles and Guidelines**

So far about goals and measures, but it doesn't help you design things. Schneiderman, Plaisant gives guidelines. Principles can be about the actual process of designing good interaction or directly about the properties of a good system after it has been designed.

Designing for Usability: Key Principles and What Designers Think. Gould, Lewis 1) Early focus on users and task 2) Empiricism 3) Iteration design

### **Access, Learn and remember**

Benyon 1) Visibility, 2) consistency 3) familiarity 4) affordance. Might lead you to better result. Also look at interface and evaluate it using the rules of thumb. If you call it Edit and Paste somewhere you should call it the same everywhere. Show the user how they operate the technology.

7 stages of Norman is super important. It gives us the Gulf of Execution and Gulf of Evaluation. I know I want to do something, I have a goal in mind, how do I do it with this technology

### **Sense of Control, Knowing what to do**

Navigation. Control: Who is in control? Is it the user, the computer, establish clarity of mapping between controls and effect.

A stove with the controls may have labels or they may be placed in a natural way the maps to the placement.

Error messages. Eliminate all error messages provide help and guidance. The software engineer should try to solve the problems himself not let the user do it.

### **In a Way that Suits Them**

Least helpful in my view: Flexibility, style and conviviality. Some people might want a lot of flexibility some might want a lot, it is hard to apply.