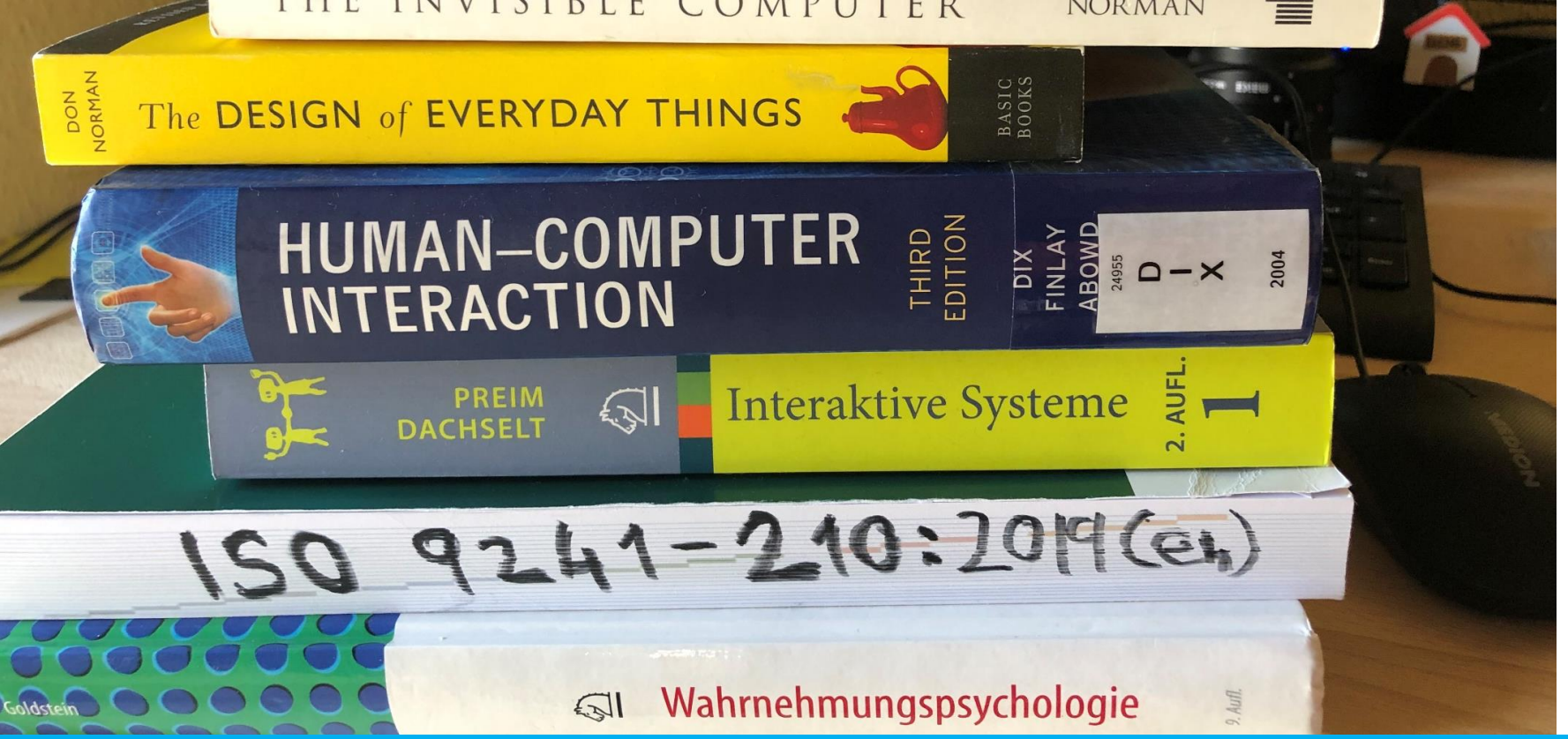


Noun [edit]

interaction (*countable and uncountable, plural* **interactions**)

1. The situation or occurrence in which two or more objects or events act upon one another to produce a new effect; the effect resulting from such a situation or occurrence. [quotations ▼]

   *Be aware of **interactions** between different medications.*

2. A conversation or exchange between people.

   *I enjoyed the **interaction** with a bunch of like-minded people.*

Terminology - Basics

Learning Goals

- Understand …
  - technical terms that are central to human computer interaction,.
  - descriptions and texts that use these terms,
  - what user interface design is.
- Be able to explain technical terms, e.g.
  - Human-Computer Interaction,
  - Interactive Systems,
  - User Interface, or
  - Utility, Usability, Likeability.
- Know definitions relevant to HCI

Human-Computer Interaction

Definition

- “Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them” (definition in the ACM SIGCHI Curricula for HCI, 1992)

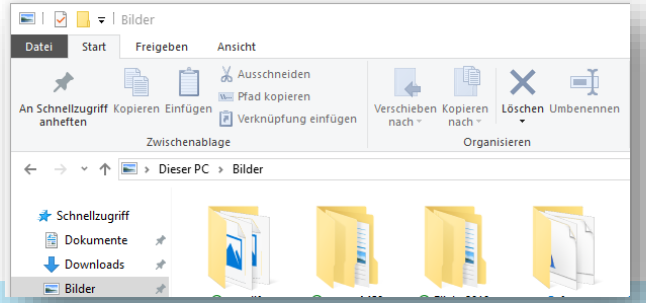
- A pragmatic computer science view point:
  How to enable interaction between one or more humans and one or more computational devices and with data.

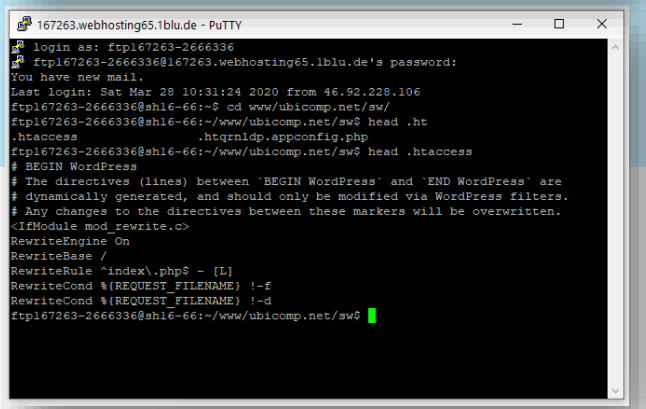
Thomas T. Hewett, Ronald Baecker, Stuart Card, Tom Carey, Jean Gasen, Marilyn Mantei, Gary Perlman, Gary Strong, and William Verplank. 1992. ACM SIGCHI Curricula for Human-Computer Interaction. Technical Report. Association for Computing Machinery, New York, NY, USA.

Interactive Systems

Definition and Examples

- An Interactive System is a computational system that allows users to interact in real-time[1]. Interactions receive instant feedback visible to the user.
- Interactive computing is used in a similar way, with a focus that is less on the systems aspect.
- Examples
  - Graphical user interfaces, such as Windows 10 or MacOS
  - Mobile devices, such as an Android phone
  - gaming consoles, such as Xbox with Kinect or Nintendo Switch
  - Ticket vending machines, such as the DB-ticket machine
  - Command line interfaces, such as an SSH console





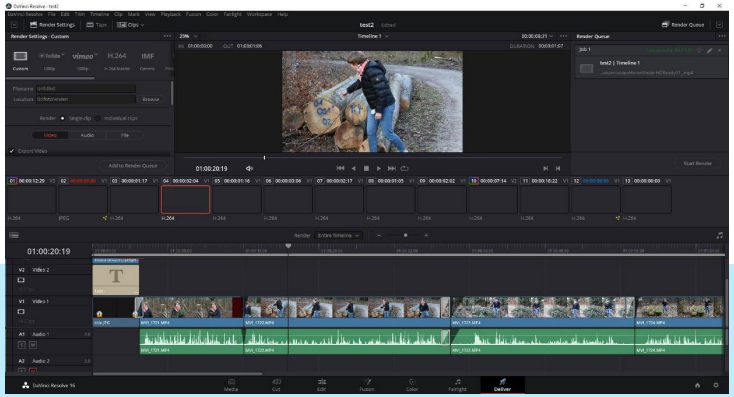
[1] *The term 'real-time' refers here to system responses that are in a time range where users perceive a instant answer. Practically this is typically under 100ms, see https://www.nngroup.com/articles/powers-of-10-time-scales-in-ux/*

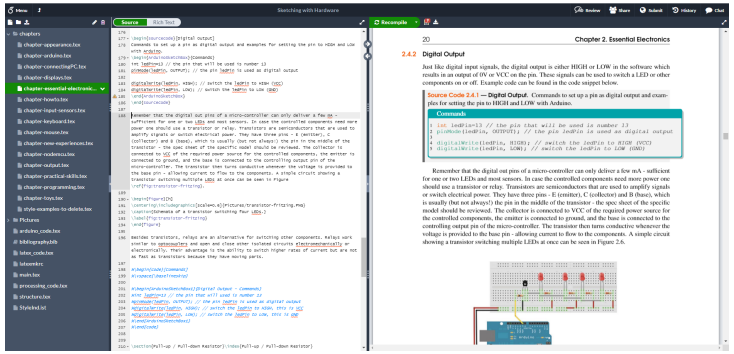
What is an Interactive Systems?

Mini-Exercise

- Which of the following devices and applications can be considered an interactive System? *
  - Why can they be considered an interactive systems?
  - Why may they be not considered an interactive system?

- Discuss one of the following
  - Professional video editing tool
  - Electronic signage at the railway station
  - Latex text processing system
  - 3D printer

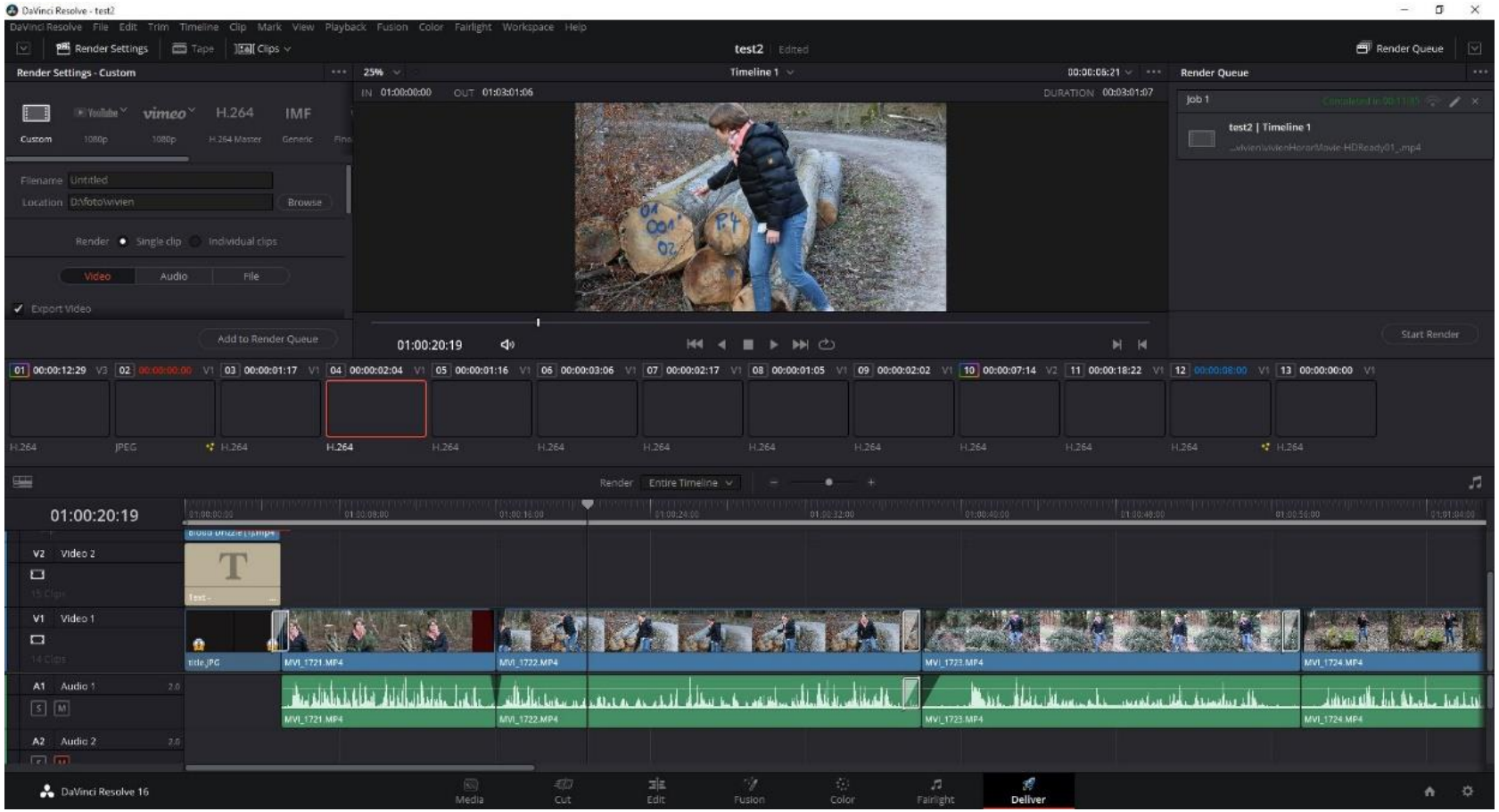




* *There may be not 'yes' or 'no' answer. Consider different aspects and think how the design impacts whether or not this is perceived as an interactive system.*

What is an Interactive Systems?

Mini-Exercise

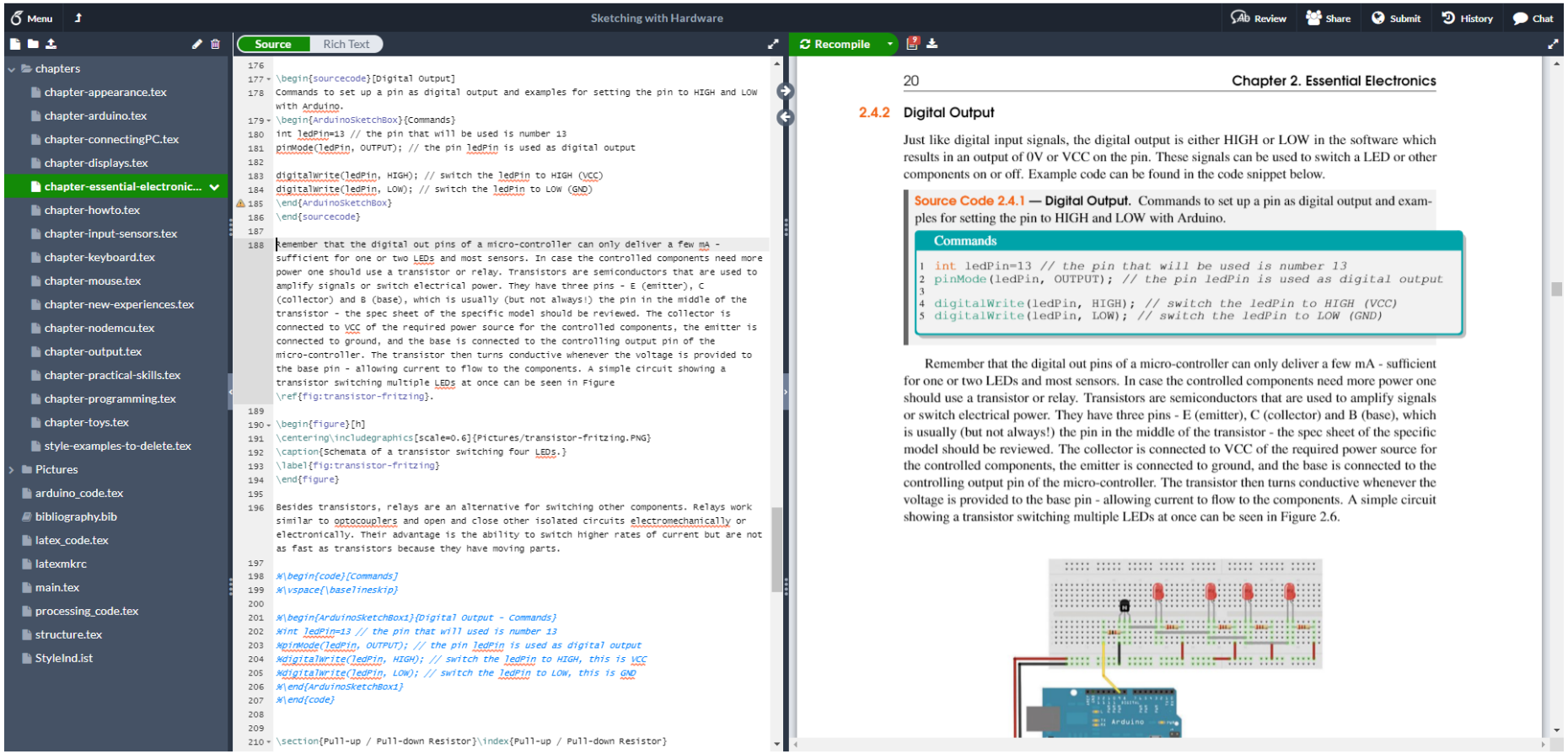


What is an Interactive Systems?

Mini-Exercise

What is an Interactive Systems?

Mini-Exercise



User Interface[1]

Definition

- The part of a system where a user can interact with a system, device or application.
- The user interfaces can support input, output or both.
- User interfaces are not restricted to digital technologies or interactive systems
- Similar terms:
  - Human-computer interface (HCI)
  - Man-machine interface (MMI) or Human-Machine-Interface (HMI)
- Examples:
  - Graphical user interface (GUI) on a web page
  - Voice user interface in a smart speaker (e.g. Alexa)
  - Buttons, switches, wheels and levers in a cockpit

[1] *in German Benutzungsschnittstelle or Benutzerschnittstelle.*

User, Interactive System, and User Interface

Definitions according to ISO 9241-210:2019(en)

- User: “person who interacts with a system, product or service”
- Context of Use: “ combination of users, goals and tasks, resources, and environment”
- Interactive System: “combination of hardware and/or software and/or services and/or people that users interact with in order to achieve specific goals”
- User Interface: “all components of an interactive system (software or hardware) that provide information and controls for the user to accomplish specific tasks with the interactive system”

https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-2:v1:en

User Interface Design and Interaction Design

Definition

- **User Interface Design** refers to the conception and design of the **user interface**, including the choice of **modalities**, selection of **interface elements** and their **placement** in the interface.

- **Interaction Design:**
  - Preece, Rogers and Sharp (2002): “Designing interactive products to support people in their everyday and working lives.”
    Jennifer Preece, Yvonne Rogers, Helen Sharp (2002) Interaction Design, ISBN: 0471492787, http://www.id-book.com/, Chapter 9
  - Winograd (1997): “The design of spaces for human communication and interaction.”
    Winograd, T. (1997). From computing machinery to interaction design. In Denning, P., & Metcalfe, R. (Eds.), Beyond calculation: The next fifty years of computing, 149-162. Springer-Verlag. http://hci.stanford.edu/~winograd/acm97.html.

Interaction Design vs. User Experience Design

Definition

- “**Interaction Design** (IxD) is the design of interactive products and services in which a designer’s focus goes beyond the item in development to **include the way users will interact with it**.” https://www.interaction-design.org/literature/topics/interaction-design
- **User Experience Design** describes the more holistic approach in **designing the experience a person will encounter** when interacting with a devices, system or application. It considers the user interface design in the broader context of use.

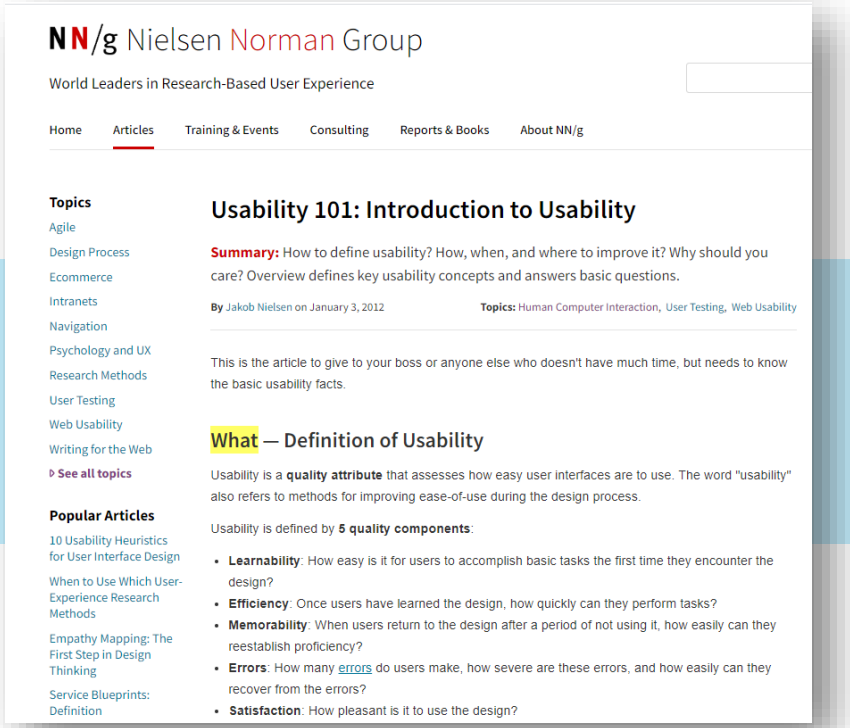
Utility, Usability, Likeability

- **Utility**
  a product can be used to reach a certain goal or to perform a certain task. This is essential!
- **Usability**
  relates to the question of quality and efficiency. E.g. how well does a product support the user to reach a certain goal or to perform a certain task.
- **Likeability**
  this may be related to utility and usability but not necessarily. People may like a product for any other reason…

What is Usability
A definition by Jakob Nielson

Usability 101 by Jakob Nielson

- “Usability is a quality attribute that assesses how easy user interfaces are to use. The word ‘usability’ also refers to methods for improving ease-of-use during the design process.”

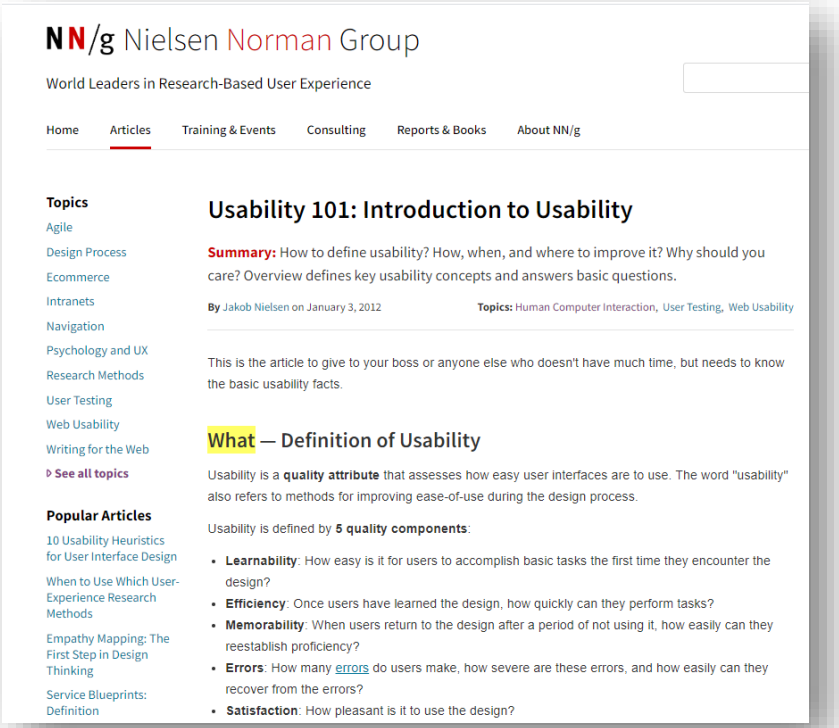


Jakob Nielsen's Alertbox, August 25, 2003: Usability 101: Introduction to Usability
https://www.nngroup.com/articles/usability-101-introduction-to-usability/

Usability has five quality components

Usability 101 by Jakob Nielson

- **Learnability**: How easy is it for users to accomplish basic tasks the first time they encounter the design?
- **Efficiency**: Once users have learned the design, how quickly can they perform tasks?
- **Memorability**: When users return to the design after a period of not using it, how easily can they reestablish proficiency?
- **Errors**: How many errors do users make, how severe are these errors, and how easily can they recover from the errors?
- **Satisfaction**: How pleasant is it to use the design?



Jakob Nielsen's Alertbox, August 25, 2003: Usability 101: Introduction to Usability
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Usability, User Experience and Human-Centred Design

Definitions according to ISO 9241-210:2019(en)

- Usability: “extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”
- User Experience: “user’s perceptions and responses that result from the use and/or anticipated use of a system, product or service”
- Human-Centred Design: “approach to systems design and development that aims to make interactive systems more usable by focusing on the use of the system and applying human factors/ergonomics and usability knowledge and techniques”

https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-2:v1:en

Did you understand this block?

Can you answer these questions?

- Describe a pragmatic computer science view point of the concept human-computer interaction.
- How can you characterize an interactive system?
- Discuss: is a video editor an interactive system?
- What is a user interface? What are similar terms? Provide Examples?
- Which ISO standard is central for human-computer interaction?
- Explain the terms utility, usability, an likeability and how they relate.
- What are the 5 quality components for usability according to Jakob Nielson?

References

- Thomas T. Hewett, Ronald Baecker, Stuart Card, Tom Carey, Jean Gasen, Marilyn Mantei, Gary Perlman, Gary Strong, and William Verplank. 1992. ACM SIGCHI Curricula for Human-Computer Interaction. Technical Report. Association for Computing Machinery, New York, NY, USA.
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- https://www.interaction-design.org/literature/article/what-is-interaction-design by Yu Siang Teo
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- Winograd, T. (1997). From computing machinery to interaction design. In Denning, P., & Metcalfe, R. (Eds.), Beyond calculation: The next fifty years of computing, 149-162. Springer-Verlag. http://hci.stanford.edu/~winograd/acm97.html.

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