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# Lecture 12: Wrap up and exam

December 5, 2023



# Plan

- Evaluation
- Learning goals etc
- Summarising the course
- About the exam
- Exam questions
- Q&A

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## **How would you improve this course?**

Ideas, suggestions etc for how we could improve this course for your fellow students who will take this course in the future

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# Learning outcome etc

# **Learning Outcomes**

## **Skills**

- understand basic and advanced concepts and theories of human-computer interaction
- be able to explain the activities in the design of an interface accurately
- be able to explain the activities of a usability evaluation

## **Competences**

- be able to apply concepts, techniques and methods to design and evaluate a specific system that solves a well-defined task

# Course materials

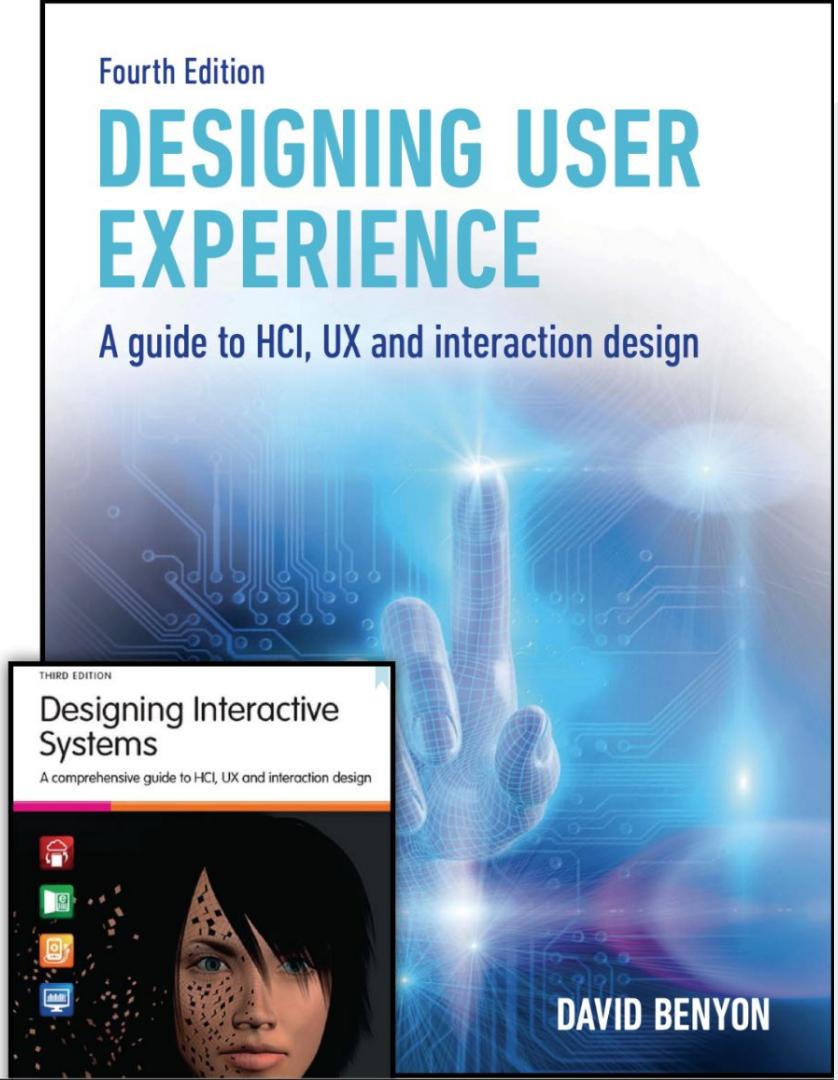
- BOOK: Benyon, D., Designing Interactive Systems, 4th.

**Physical book - AND/OR**

**Online 3rd ed. version free through AUB**

**Also on Moodle:**

- Scientific papers
- Links to articles, videos, etc.
- Slides in PDF form



# Course Schedule

Date	Type	Time
September 12	Lecture + Exercises	12:30 – 16:00
September 19	Lecture + Exercises	12:30 – 16:00
October 3	Lecture + Exercises	12:30 – 16:00
October 10	Lecture + Exercises	12:30 – 16:00
October 24	All-day workshop: prototyping	9:00 – 16:30
November 7	Guest Lecture	12:30 – 16:00
November 14	Lecture + Exercises	12:30 – 16:00
November 21	Lecture + Exercises	12:30 – 16:00
November 28	All-day workshop: usability evaluation	9:00 – 16:30
December 5	Lecture + Exercises	12:30 – 16:00

All-Day Workshops: we strongly suggest that you use the workshops for advancing your semester project, but you can work on separate ideas as well.

# Semester project

- Requirement: conduct a usability evaluation on your system
- Recommended:
  - Elicit user needs to complement your system requirements (sometimes, user != client!)
  - Prototype your interface design before implementing it and get user feedback
  - Apply HCI concepts to improve the usability and UX of the system

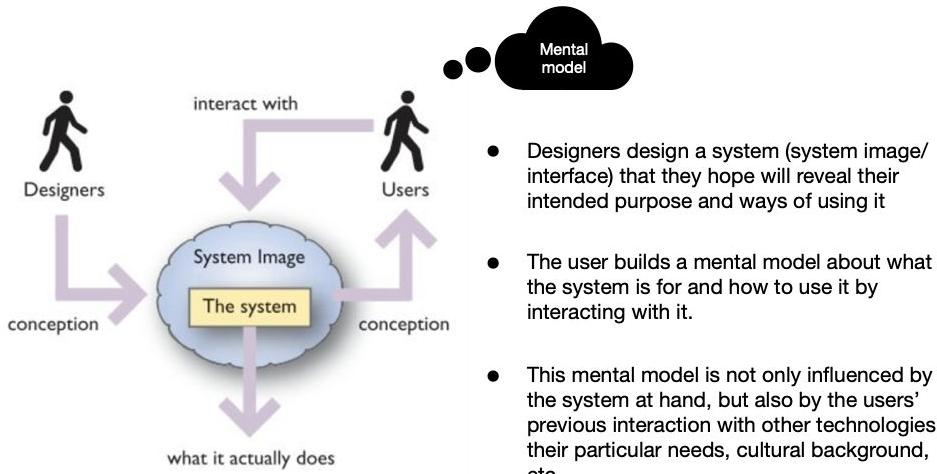
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# **First part of the course with Carla**

## Usability

*“The effectiveness, efficiency, and satisfaction with which specified users achieve specified goals in particular environments.”*

## System Image vs. Mental Models



## System Image $\longleftrightarrow$ Mental Model

To design a system that is easy to use, the distance between the system image and mental model has to be as minimal as possible

## Human-centred design process of interactive systems

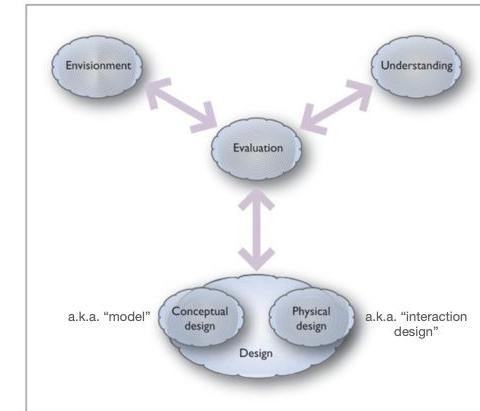


Figure 3.1 Understanding, design, evaluation, envisionment

## Heuristic Evaluation

Nielsen's 10 usability heuristics:

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation

## PACT: Useful for both understanding and design

### People:

Who are the users of the system? Who are we designing for?

### Activities:

What tasks or activities do users perform within the system?

### Context:

In what environments do users typically interact with the system  
(e.g., office, home, on-the-go)?

### Technologies:

What are the technologies that can best support users in their activities?

## Look for *pains* and *gains* in the intersection of PACT

### Pains - What is working poorly?

- In what ways is the current technology failing to support the activity?
- Are there user groups that are poorly supported by the current design?
- Are there contexts where the activity is harder/impossible to perform?

### Gains - What is working well?

In what ways does the current technology excel at supporting the users' activities?

In what context is the activity best supported?

How is the technology successfully supporting diverse types of users (i.e., with different needs and skills)?

**You are not designing for you! Involve potential users in the design process to gather:**

- stories of lived experiences (e.g., anecdotes)
- descriptions of typical use
- (mis) understandings
- opinions and values
- desires

**Attention:** our job as designers is to interpret and look beyond the data as collected: e.g., What are the needs behind what users say they want? What are the underlying problems behind what users complain about?

Remember: **look for surprises!** It's good to confirm what we expect about users, but it's better to learn new things about them to find opportunities for design

## Data collection methods

**Interviews**

**Observations**

**Questionnaires**

**Contextual Inquiry**

**Design Probes**

**Literature review**

**User-generated content**

# Data analysis

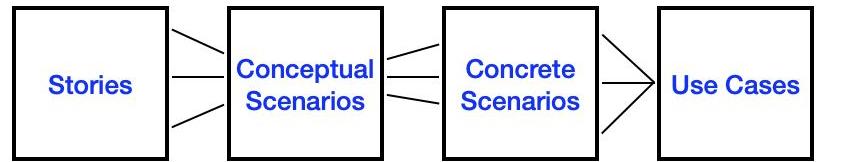
Qualitative data (interviews, observation notes, open questions in surveys, etc)

- Inductive / bottom-up approach: We look for patterns in the data. As we find patterns, we name them as categories or “themes” that give us a high-level view of key insights from the data.
- Deductive / top-down approach: We already have categories, themes or questions that we’re interested in, and we categorize data according to them.

## From data analysis to problem statements

- While requirements are about a system, problem statements are about user needs.
- A problem statement should be clear about **who's the user, what's their need, and their goal**.

“[A user] needs [need] in order to accomplish [goal].”



Specific stories of users, they could come from interview/survey/observation	Abstraction of related stories with emphasis on a goal/activity that the system should	A detailed case of specific personas in a specific context performing an activity	A step-by-step description of how a user performs an activity with the system, ready to use as a specification for programmers
We saw examples of stories in the data we analyzed before	Very similar to functional	Here's where we have to think of a design in more detail! How exactly will the system let the user achieve their goal?	Part of the UML modelling of a

## From problem statements to concrete scenarios

- Ask “How might we...” questions about the problem statements
  - Problem: “Users don’t know how to transfer the message history from WhatsApp to Telegram”
  - How might we make message transfer between apps easy to find and efficient?

## Storyboards

Don't focus on drawing pretty or usable interfaces!

Focus on communicating **the goal of a system, the task the users perform.**

## Paper Prototypes

- Once you know what the task is going to be, you can start focusing on how the interface will look like, and how users will interact with it
- Paper prototypes are ideal for early design stages, to sketch and test interfaces fast

## High-Fidelity Prototypes

- Useful for communicating precise ideas to the development team, as well as testing the usability of the interface

## Socio-technical principles

- Theoretical concepts about human behaviour that are design
  - Distributed cognition
  - Rhythms and routines
  - Situated action
  - Artifact ecologies

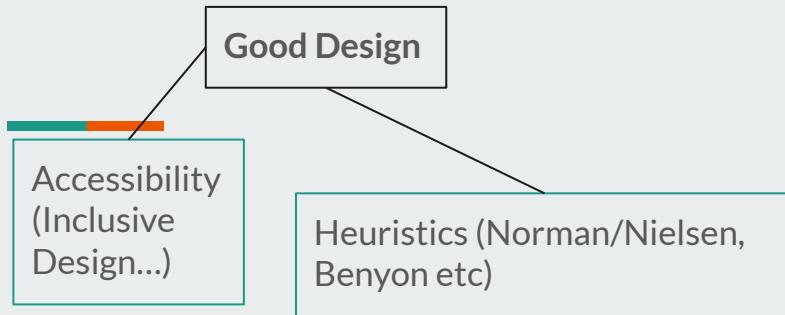
# Branching Storyboards

- Recap: in a storyboard, we see how a user solves a problem by using our system.
- Your first storyboard shows “the ideal” path
- But when designing interfaces, we have to think about what goes wrong!
- Storyboards can have **branches**, where the user experiences a **breakdown** and your design should help them recover as best as possible
- Breakdowns are unexpected situations that prevent the user from achieving their goal. For example:
  - They need to use a map application, but they’re in an area without mobile data coverage so the map doesn’t load
  - They receive a voice message with important information, but can’t listen to it because they’re in a meeting
  - They forget their login password or other essential information needed to use the system

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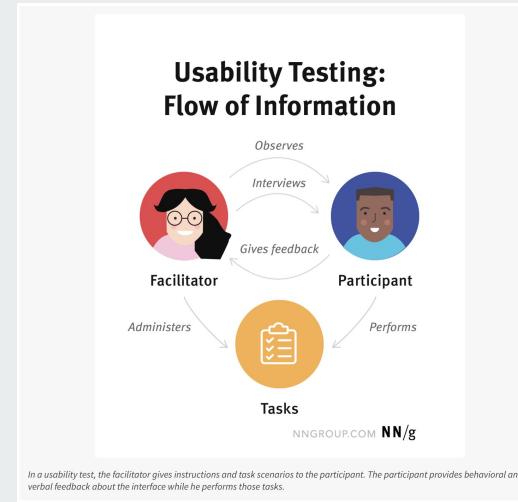
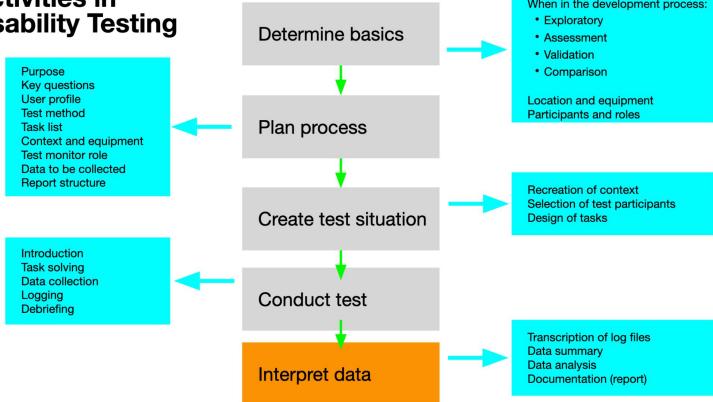
# **Second part of the course with Jeanette**



## How Do We Evaluate Usability?

Testing  
Inspection  
Data Analytics

## Activities in Usability Testing



## Different settings: Lab vs. Field Test

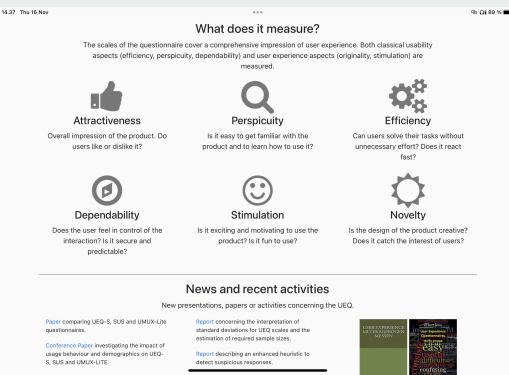


# What is User Experience?

## ISO 9241-210 definition:

“A person's **perceptions** and **responses** that result from the **use or anticipated use** of a product, system or service...”

## User Experience Questionnaire



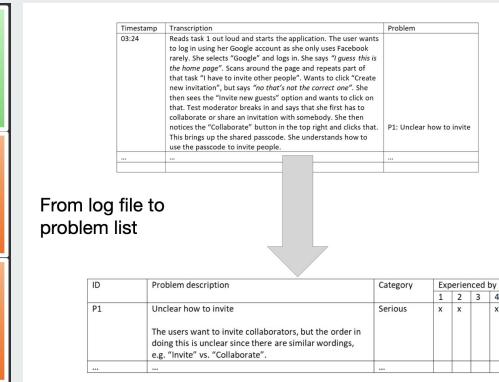
It is concerned with all the qualities of the interactive experience that make it memorable, satisfying, enjoyable and rewarding.”



When does UX start and end?



	Delay	Irritation	Expectation vs. actual
Cosmetic	< 1 minute	Low	Small diff.
Serious	Several minutes	Medium	Significant diff.
Critical	Total (user stops)	Strong	Critical diff.



## Test moderator / monitor

### Important characteristics:

- Solid knowledge about usability
- Fast learner
- Can establish good relations to subjects
- Good memory
- Good at listening
- Good at communicating
- Can handle uncertainty
- Flexible and capable of improvising
- Can stay alert for a long time
- Can maintain an overview

### Typical problems:

- Controlling rather than supporting
- Too focused on data collection
- Sticks too close to test plan
- Appears better knowing
- Does not establish good relations
- Jumps to conclusions

## Challenges for Think Aloud tests

## Instant Data Analysis: Conducting Usability Evaluations in a Day

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### ABSTRACT

When designing a usability evaluation, key decisions must be made regarding methods and techniques for data collection and analysis. Although there is a strong body of research within human-computer interaction regarding the appropriate choices of data collection methods and

expensive. Hence, with the purpose of reducing effort and increasing return of investment, the last decade of usability research has investigated extensively into questions such as which experimental methods to apply [3], how many evaluators to involve in expert- and user-based studies [2], how many test subjects to use for user-based studies [8, 17],

	IDA	VDA	TOTAL
Critical	11	12	13
Serious	15	15	22
Cosmetic	15	19	27
Total	41	46	62

**Table 1. Numbers of usability problems identified using the Instant Data Analysis technique (IDA) and using the Video Data Analysis technique (VDA).**

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# Exam

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## **Exam format, 20 min in total, graded**

1. Prepare a 5-minute presentation for each of the exam questions. You should prepare 8 presentations in total (5 minutes each).
  - a. Make sure to practice the timing, as we will stop you after 5 min.
2. During the exam, you will draw 1 question at random and present your slides to the examiner and censor
  - a. Therefore, have all 8 presentations open and ready on the computer when you enter the exam room!
3. After the presentation, there will be 10 minutes of questions from the examiner and censor
4. The student leaves the room and the examiner and censor discuss the grade
5. The examiner calls back the student who receives the grade

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## Exam Questions (4/8)

- 1) The design process:** Describe the phases in Benyon's design process and what the connection between the different phases is. Discuss benefits and challenges of lo-fi prototyping in the early phases of your project's design process.
- 2) Understanding 1:** Describe what PACT is and which data collection techniques are used to uncover PACT. Choose a data collection technique relevant for your project and discuss its benefits and challenges in terms of your project goals
- 3) Understanding 1:** Describe a method for understanding user needs. Discuss when in a design process the method should be conducted and discuss why it is important to understand user needs.
- 4) Design 1:** Discuss the role of visual design principles in creating user-friendly interfaces. Provide examples of user interfaces and discuss how effectively they apply visual design principles.

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## Exam Questions (8/8)

- 5) Design 2:** Describe the role of prototyping in the design process and provide examples on how prototyping informs your own design process. Discuss the advantages and disadvantages of lo-fi and hi-fi prototyping.
- 6) Evaluation 1:** Describe the differences between usability and user experience, and discuss how the two can be evaluated. Discuss the most important usability and user experience aspects of your project's user interface: How could the usability and user experience of the user interface be improved in a future redesign?
- 7) Evaluation 2:** Which methods can be used to evaluate usability and what are their advantages and disadvantages? Provide examples on the different kinds of usability problems, for example from your semester project, and discuss how usability problems can be used to improve a user interface design.
- 8) Evaluation 3:** Describe usability and accessibility and discuss how they relate to each other. Discuss the most important usability and accessibility aspects of your project's user interface: How could the usability and accessibility of the user interface be improved in a future redesign?

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## Exam Questions

All exam questions ask you to describe DEB concepts as well as how the DEB concepts relate to your semester project. If you haven't done the semester 3 project, you can talk about another project you've done or any user interface example of your choice. If you have applied the DEB concepts in any of your projects, you're encouraged to answer the question based on your experience. Otherwise, you can discuss how the DEB concepts could potentially be applied to the example of your choice.

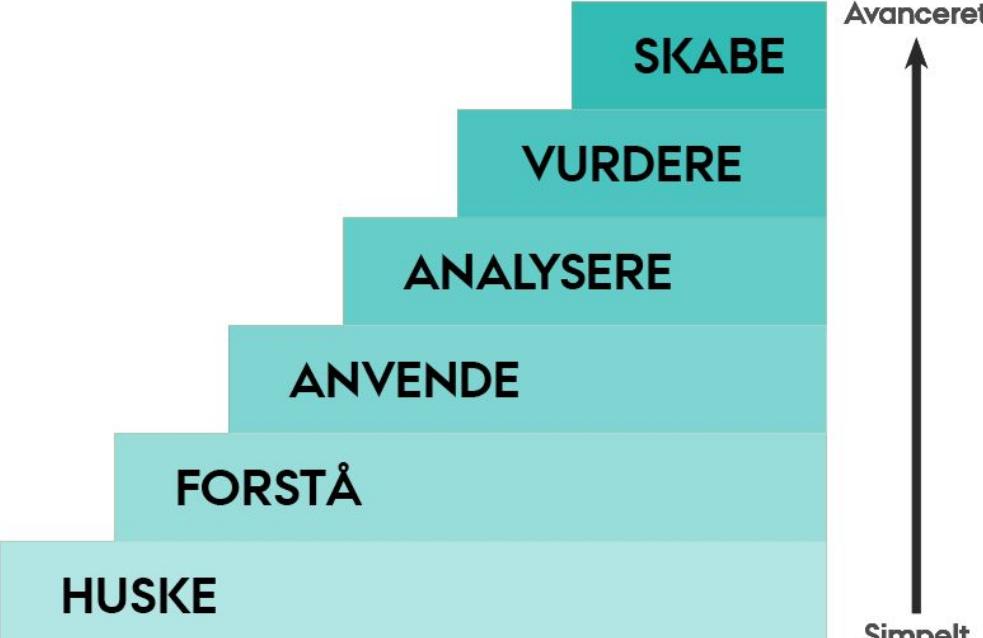
**The following DEB concepts have been covered in the course and can be: a) used in your presentations to answer any question, if you think they are relevant, and b) used in follow-up questions by the examiner and censor**

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- Usability
- User Experience
- Prototyping (hi-fi, lo-fi)
- Scenarios
- Storyboards, branching storyboards
- Breakdowns
- "How might we..." questions
- Socio-technical principles (situated action, rhythms and routines, artifact ecologies, distributed cognition)
- Visual design principles (gestalt laws, grids, etc)
- Data collection methods (interviews, questionnaires, observations, technology probes, internet search)
- Inductive / deductive qualitative analysis
- Heuristic evaluation (Nielsen)
- Design golden rules (Schneiderman)
- Design process and phases (Benyon)
- PACT
- Mental Models and System Image
- Good design
- Accessibility and Inclusive design
- Activities in Usability testing (determining basics, planning, create test situation, conduct test situation, interpret data)
- Methods in Usability testing (Expert-based methods (Inspection), Participant-based methods (Testing), Data on system performance (Data Analytics))
- Lab vs. Field test
- Think Aloud test
- System Usability Scale
- Usability problems, problem list and categorizing problems
- Instant Data Analysis vs. Video Data Analysis
- Test moderator role

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# Bloom's Taxonomy



## Husk



Når du demonstrerer, at du har tilstrækkelig faktuel viden, relevant fagsprog og viden om grundlæggende koncepter, viser du, at du har nået det taksonomiske niveau "At huske".

### DEMONSTRER AT DU KAN HUSKE VED AT:

- Beskrive
- Opliste
- Navngive
- Identificere
- Genkalde
- Genkende
- Nævne

### RELEVANTE HANDLINGER KUNNE VÆRE AT:

- Beskrive, hvad der er sket
- Nævne, hvor mange ...
- Fortælle, hvem ...
- Beskrive, hvad der er ...
- Identificere, hvad der er sandt og falskt.

## Forstå



For at vise at du har nået det taksonomiske niveau "At forstå", skal du demonstrere din forståelse af relevante fakta og idéer.

### DU DEMONSTRERER DIN FORSTÅELSE VED AT:

- Organisere
- Forklare
- Fortolke
- Sammenligne
- Oversætte
- Parafrasere (genfortælle med dine egne ord)
- Give eksempler

### RELEVANTE HANDLINGER KUNNE VÆRE AT:

- Give et overblik over ...
- Forklare, hvad hovedpointen var
- Fortolke en tekst for at vise, hvem der var hovedpersonen
- Lave en sammenligning for at belyse forskellene mellem to ting
- Give eksempler på ...

## Anvend



Ved at demonstrere at du kan bruge din viden om fakta, metoder og idéer til at løse problemer på en ny og anderledes måde, kan du vise, at du har nået det taksonomiske niveau "At anvende".

### DEMONSTRER AT DU KAN ANVENDE VIDEN VED AT:

- Vise
- Bruge
- Konstruere
- Undersøge
- Klassificere

### RELEVANTE HANDLINGER KUNNE VÆRE AT:

- Vise, at du kender et andet tilfælde af det samme
- Klassificere noget ud fra bestemte kendetegn
- Anvende en metode på dine egne erfaringer
- Formulere dine egne spørgsmål til emnet
- Udvikle et sæt instruktioner baseret på emnet

## Analyser



Når du har nået det taksonomiske niveau "At analysere", kan du undersøge og nedbryde din viden til mindre dele og vise, at du kan skelne mellem de forskellige dele.

### DEMONSTRER AT DU KAN ANALYSERE VED AT:

- › Sammenligne
- › Analysere
- › Kategorisere
- › Undersøge
- › Identificere

### RELEVANTE HANDLINGER KUNNE VÆRE AT:

- › Sammenligne med andre tilfælde og finde ligheder
- › Sammenligne med andre tilfælde og finde forskelle
- › Identificere bagvedliggende temae
- › Identificere problemer
- › Skabe brugbare distinktioner og kategorier
- › Undersøge motiver, vendepunkter og vigtige perspektiver

## Vurder



At vurdere og bruge sin dømmekraft til at tjekke, kritisere og forsvere dine beslutninger og dit standpunkt er måder at demonstrere, at du har nået det taksonomiske niveau "At vurdere".

### DEMONSTRER AT DU KAN VURDERE VIDEN VED AT:

- Bedømme
- Diskutere
- Kritisere
- Anbefale
- Retfærdiggøre
- Argumentere
- Evaluere
- Efterprøve

### RELEVANTE HANDLINGER KUNNE VÆRE AT:

- Rangere forskellige løsninger
- Diskutere, om der findes bedre løsninger på problemet
- Kritisere et perspektiv
- Anbefale en løsning frem for andre
- Forsvare dit synspunkt
- Argumentere for, hvorfor noget er godt eller dårligt

## Skab



Du kan vise, at du har nået det taksonomiske niveau “At skabe”, når du laver et nyt produkt, får en ny idé eller fremscætter et nyt perspektiv.

### DU DEMONSTRERER, AT DU KAN SKABE VIDEN, NÅR DU:

- Opfinder
- Designer
- Forudser
- Forestiller dig noget
- Formulerer noget nyt

### RELEVANTE HANDLINGER KUNNE VÆRE AT:

- Opfinder nye måder at anvende...
- Designe en eller to mulige løsninger på...
- Fremstiller mulige scenarier for ønskelige ændringer
- Forestiller dig, hvordan du ville handle i en situation
- Udvikler forslag til handlinger, der kan løse et problem



## Remember

The exam is *not* about selling a good product to us - it is about showing that you can apply the theory and reach a higher level of understanding (cf. Bloom's Taxonomy)

Be critical towards your own process! Reflect on what you have learned and what could have been done better in the design process or in the user evaluation part - how would you improve the process if you had to repeat it in the future?

Signpost your presentation and answers with the key terms from the course - show that you understand them and can apply them to your own examples

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# Questions?

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