UX Expert Review

Based on Human Factors Design Drivers Grounded in the Levels-of-Cognition Model

Version 2.1, April 2020.

DESIGN PSYCHOLOGY

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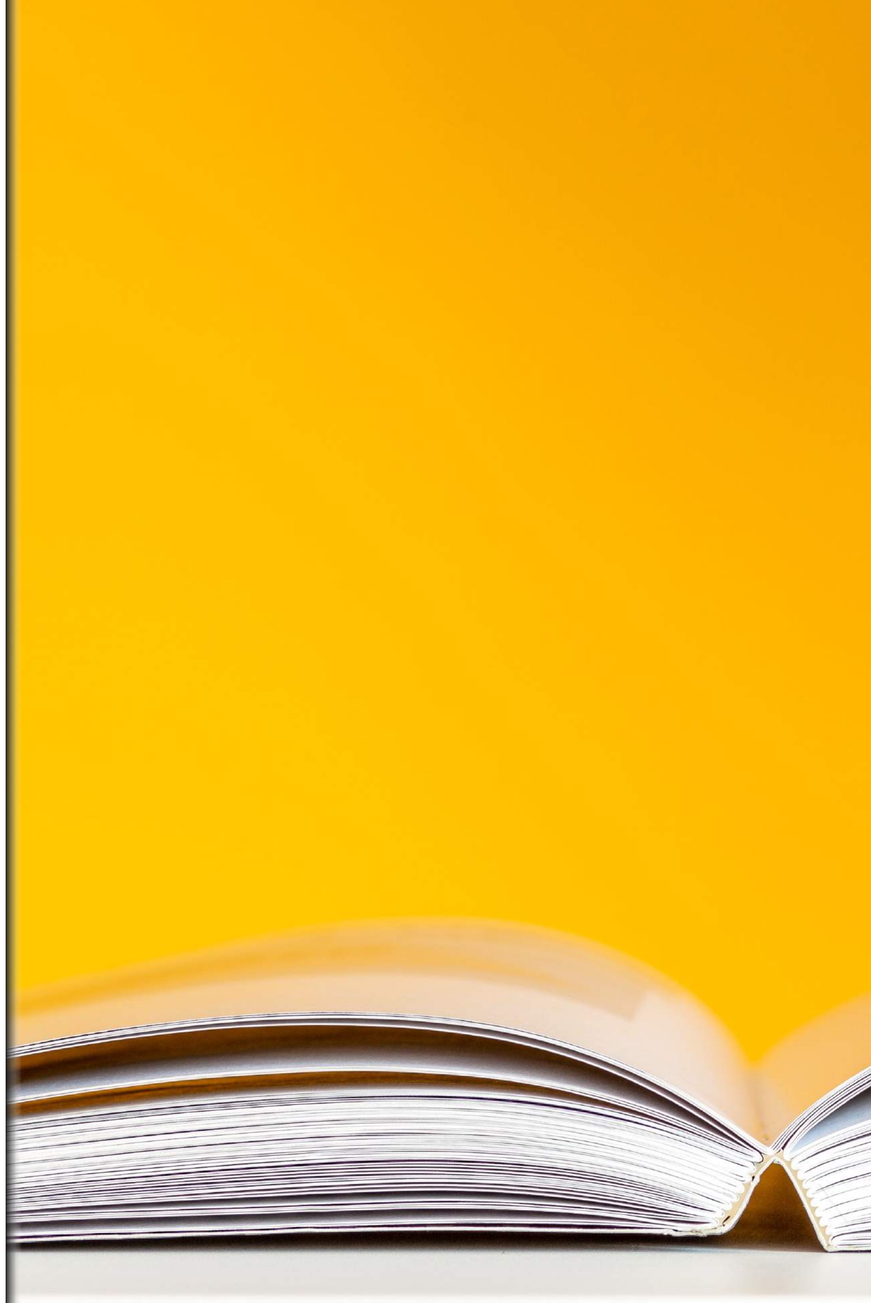
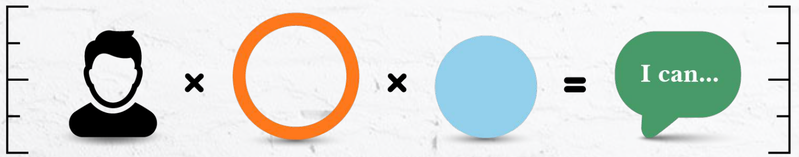


1. Introduction to UX Expert Review

- Review background
- Review focus
- Relationship to design guidelines and heuristics
- Relationship to accessibility



Review Background

A tool to quality ensure that your design delivers intuitive, easy-to-use and frictionless experiences

A UX Expert Review secures that your design is compatible with the way human beings, most effectively and naturally, process information.

This is the key for designing user interfaces that yield intuitive and easy-to-use experiences. And it is also a building block for designing user interfaces that are robust in the face of stress.

The UX Expert Review is carried out by plotting your design against a detailed set of drivers of how human beings function.

In addition, when possible, you can use domain-specific best practice guidelines for standard design elements which are already widely used in the market.

Benefits of UX Expert Reviews:

- Review of design at all maturation levels - even pre-design conceptual ideas.
- Systematic review using evidence-based design drivers.
- You can supplment your reviews with examples based on the design drivers
- Very fast turn-around for agile projects: Down to same-day feedback possible.

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UX Expert Review Focus

See mini-lesson about the UX-ValuEQ

From the HCD seminar you should be familiar with the UX Value Equation depicted below.

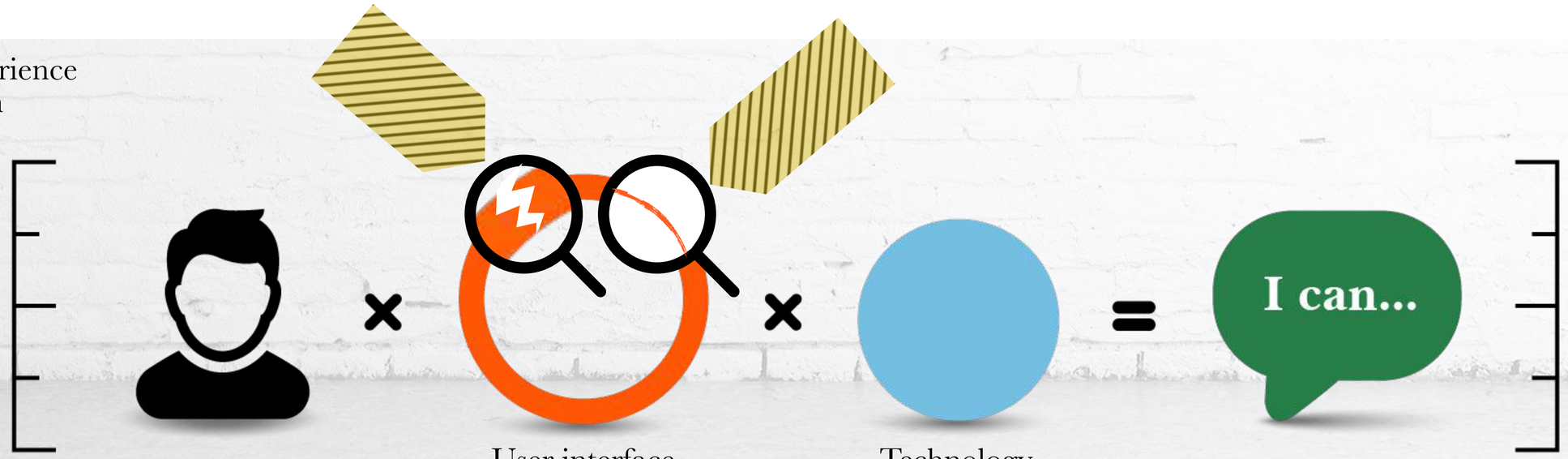
The user interface is coloured red in the in the model to denote that it should match the basic cognitive functions to the largest extent possible (which are coloured red and orange).

You can think of the UX Expert Review as an exploration to find areas in the user interface that have “cracks”. These cracks denote weak spots.

An alternative way to look at it is as an inspection to find the places where the user interface is too thin to fully cover the raw complex technical functionality (coloured blue and referred to as the core technology).

It is purposefully coloured in blue to display that it requires the blue intellectual skills to figure out

The user experience value equation UX-ValuEQ



Relationship to Design Guidelines and Heuristics

A solid bedrock of Human Factors science: Design Drivers are about people, not design

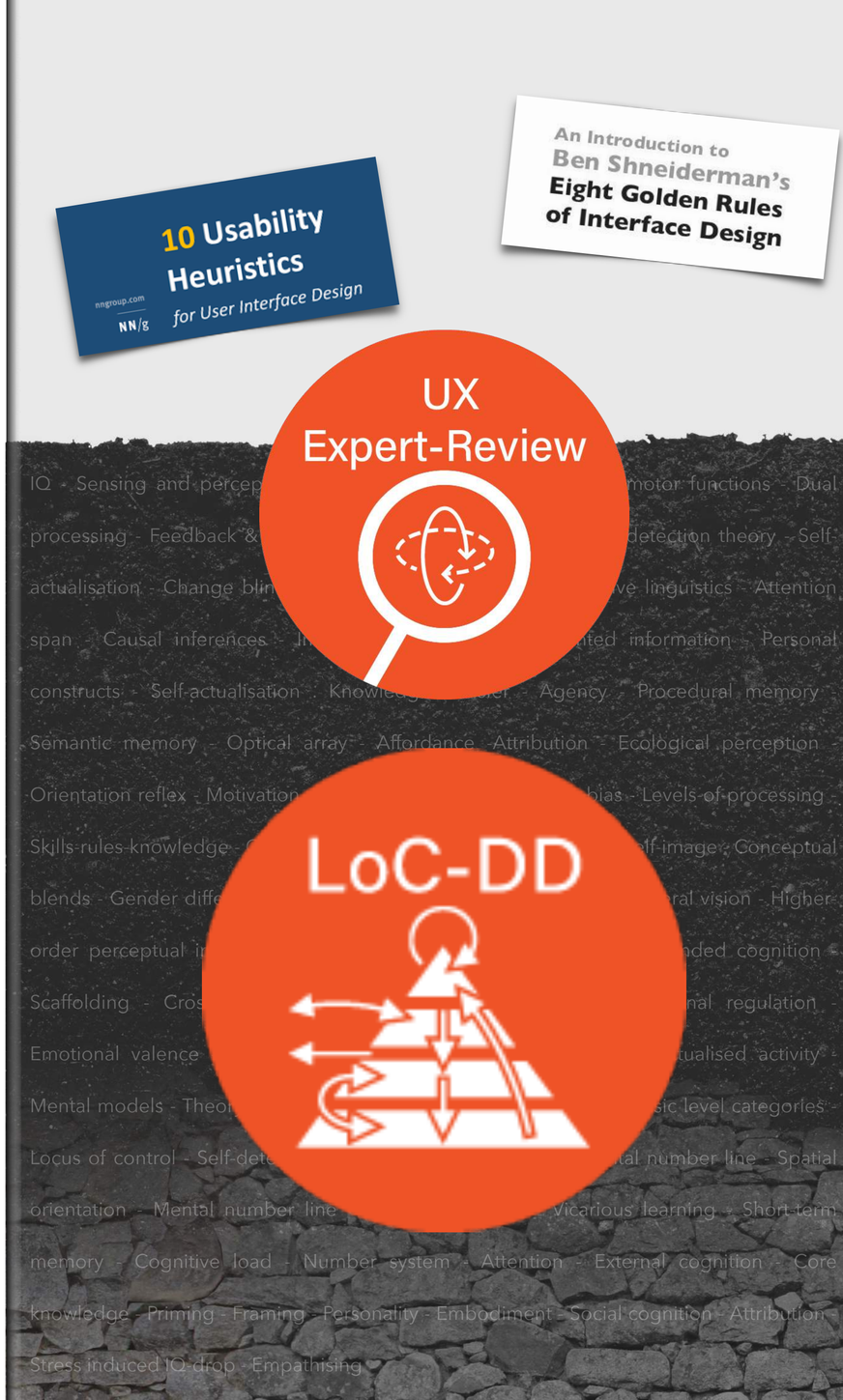
Traditional *Design Guidelines* and *Heuristics* are derived from best practice knowledge and experience of what typically produces user errors.

In that sense, they only relate to what already exists. This approach usually generates an overabundance of guidelines. The traditional way to address this is to create higher-order and more generic heuristics.

However, this approach still lacks a solid core: the underlying psychological mechanisms that drive behaviour observed with technology.

Design Drivers are quite different. They are derived from a deep scientific understanding of how people function.

Design Drivers deliver a resilient framework for understanding which qualities the design needs to incorporate -in relation to people- in order to benefit from humans' powerful skills and to avoid our limitations. Design Drivers yield, as well, the benefits usually gained from traditional *Design Guidelines* and *Heuristics*.



Relationship to Accessibility

Where do accessibility requirements fit into the UX Expert Review?

Short answer - they don't.

The UX Expert Review focuses only on the cognitive aspects of the user interface (with a few minor exceptions from external cognition).

However, it is natural to combine this review with supplemental review lenses, for instance, accessibility considerations.

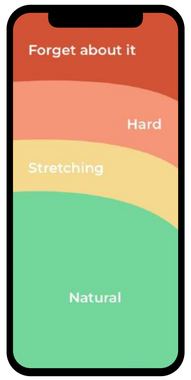
These additional lenses are NOT covered in this UX Expert Review manual. However, we will provide a few notes about accessibility.

At UX-Campus, we break UX down into six dimensions of usability. Accessibility is one of them.

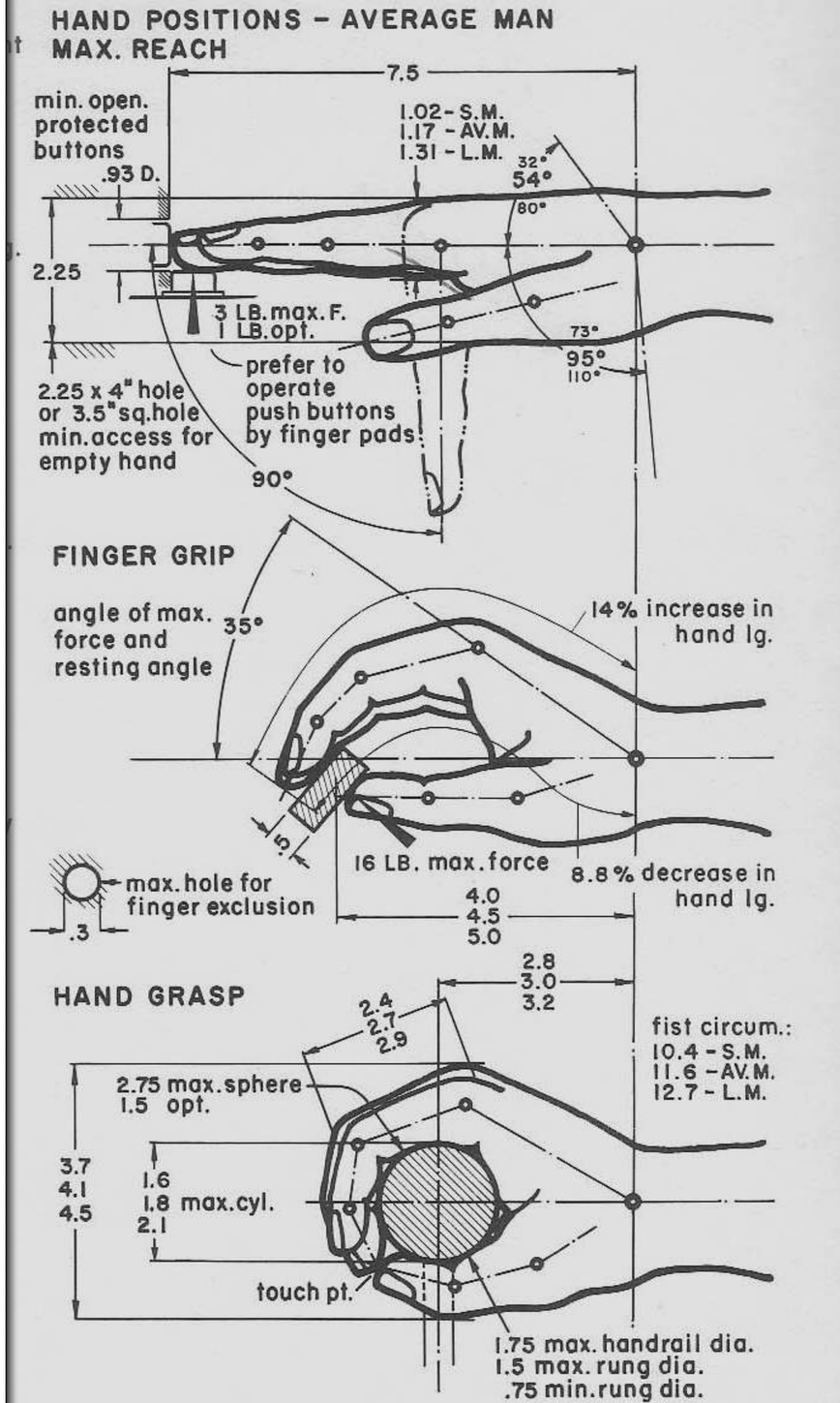
Accessibility, in itself, is composed of three broad dimensions:

1. Person accessibility (e.g. colour blindness)
2. Technological accessibility (e.g. incompatibility)
3. System accessibility (e.g. structural power asymmetries between users and system owner).

In the near future we will have a dedicated course on accessibility.



Accessibility



2. Review Process Overview

- *Phase 1*: Use, exploration and documentation
- *Phase 2*: Review, root-causes and design hacks
- *Phase 3*: Reporting and design solutions

Phase 1.
Use, exploration and documentation

Phase 2.
Review, root-causes and design hacks

Phase 3.
Reporting and design solutions

Phase 1:
Use, Exploration and Documentation

"The objective of Phase 1 is to identify and document potential problems for subsequent root-cause analysis.

The mindset is to stress-test the design by putting yourself in the role of a user that, at a glance, tries to make sense of your design. While this may appear as an artificial use case, it nevertheless provides valuable insights about the quality of the governing logic of your design.

This use and exploration can only be done once by a person, so it needs to be done right. It is also important to document: it should be video recorded -even when a graphical user interface could be screen recorded- as we need to capture the user and the system together in action.

The use and exploration need to be done without interruptions, so place any other tasks you may have on hold.

Don't waste time writing down during your use exploration. Simply express your comments out loud to the recording camera.

If you consider using a “co-pilot” from your design team for the review, make sure not to engage in dialogue. It often happens that designers are inclined to assist in using the system.

The findings from this exploration phase will be subject to detailed root-cause analysis using the design drivers in phase 2.

Remember

- Try out the design without reflecting to much on it.
- Stress test it by casually browsing through the functions.
- Ensure you are not interrupted.
- You can only do it once as you will quickly learn and overcome problems.
- Video record everything for later analysis and documentation.

Intended User, Use and Context

Higher-order cognitive functions, such a analytical skills and problem solving, are influenced by differences related to user types, intended use and the context of use. Therefore, a UX Expert Review should consider:

(1) *who are the intended users,*

(2) *what is the intended use and*

(3) (*what the relevant use contexts will be*.

Knowledge about these three points may provide valuable input to the review.

However, remember that a key tactic to create intuitive user interfaces is to actively try to unburden the higher-order cognitive functions. This is achieved by moving the interaction with the user interface towards the basic cognitive functions. In doing so, the UX Expert Review becomes less and less sensitive to differences in user type, use and context. Indeed, a value proposition related to use of the design drivers is that we can design for a global market.

For practical purposes, we recommend to first incorporate the contextual factors (user, user and context) in Phase 3 of the report out co-analysis of redesign solutions with the design team.

A Note on Severity Rating

Severity ratings is an imprint way for design teams to prioritise budget, time and other important project ressources.

When we conduct usability tests all identified issues are assigned a severity rating relative to the consequence of the intention breakdowns. Also, the classical design guideliens and heuristics assign severity ratings to identified issues.

The UX Expert Review does not assign severity ratings. The reason is twofold.

First, the identified issues are not breakdowns in the interaction our technological issues - but issues related to human cognitive reassures and constraints. As such, all the issues will in different ways drive friction and breakdowns in the use of the design. However we cannot quantify these 1-1.

Instead all issues should be candidates for fixing.

Second, the discussion about consequences and what can easily be fixed is a discussion that should be had during the design solution co-creation with the design team as the report is presented.

From individual issues to combined impact

That being said there will always be certain issues identified that fall into the category of catastrophic consequences that are mandatory to fix. However, the mindset still needs to be that the aggression of minor issues will in combination potentially lead to a catastrophic results.

It it thus dangerous to consider the findings as standalone issues. Instead, each issue interacts with the others as well.

Phase 2:

Review, Root-Causes and Design Hacks

Review.

The formal part of the review is like taking an X-Ray of the user interface design. Here you systematically work your way through all components of the user interface using the design drivers. Think of it as observing the user interface design with seven different lenses, where each one allows you to see different qualities.

Remember that each design driver "lens" has many different facets with different implications for your design. With time, you and your team will develop a more detailed understanding of how to apply the lenses to your product.

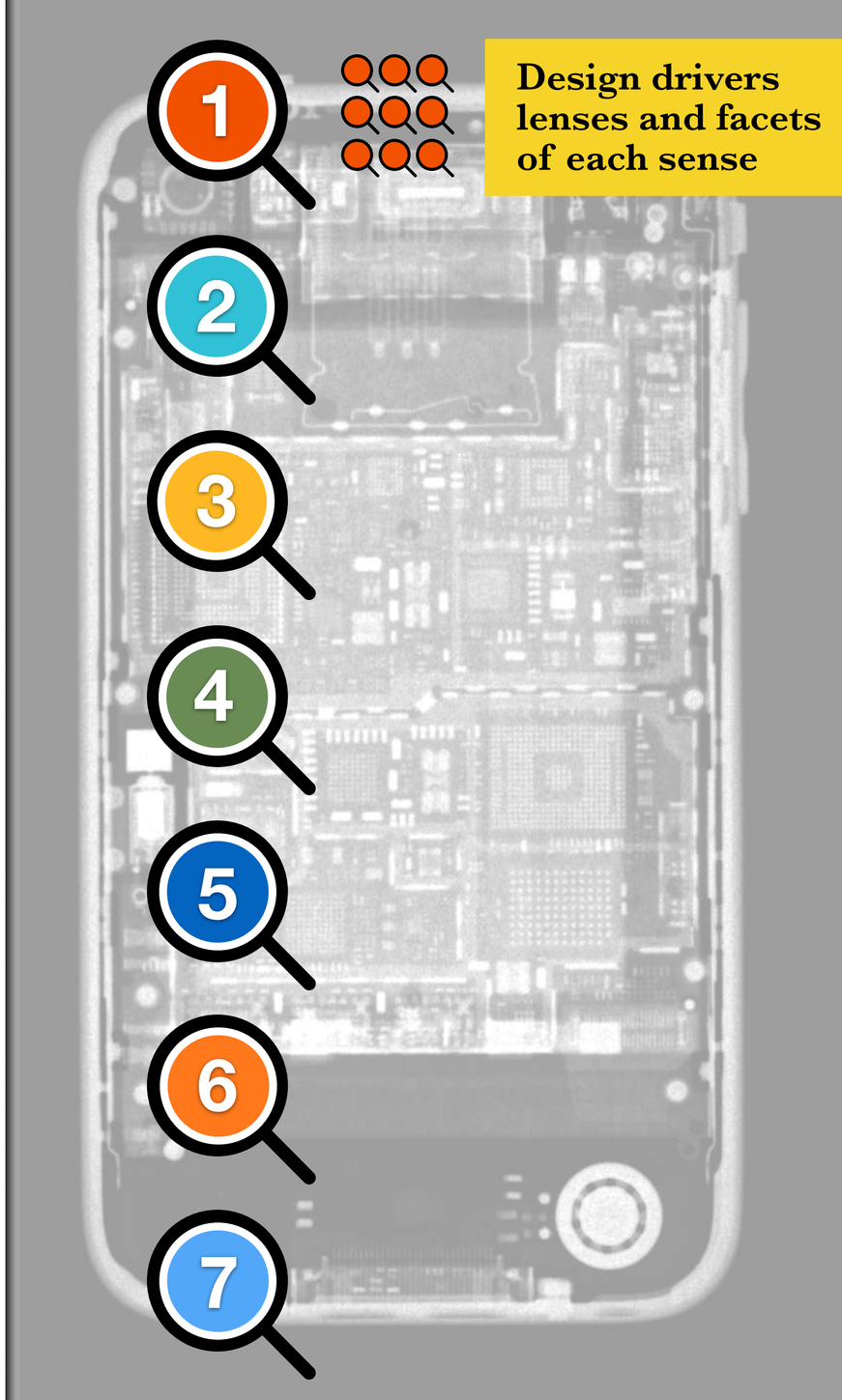
Root causes

The findings from phase 1 should also be integrated with the more formal analysis. Try to understand the friction and breakdowns you experienced by relating it to the design drivers lenses. In effect this is a root-cause analysis.

Design hacks

To clearly communicate problems identified with the the design driver lenses we recommend design hacks. The analysis templates (page 21 onwards) show what design hacks can look like. We also used them throughout the teaching videos to show problems with what is AND what a redesign could look like.

You do not need to be a graphical designer to make design hacks. Most design hacks can be done in Powerpoint. Their purpose is not to communicate ***THE*** solution but what ***A*** solution could be using the design driver.



Design Driver 1: *Embodiment*

Main questions to consider:

- ➡ Is information available in a (correct) non-symbolical format?
- ➡ Does the non-symbolic information tell the right story?
- ➡ Are any basic properties of the physical reality being violated?

Supportive tools

- On Apple computers use the terminal window overlay as an easy inspection tool.
- On PCs use the Powerpoint solution to blur.

1. Space

- ☐ 1.1. Is information available in a non-symbolical format?
- ☐ 1.2. Spatial layout and dynamics.
- ☐ 1.3. Can information be identified relative to a differentiated spatial layout?
- ☐ 1.4. Are spatial relationships preserved?
- ☐ 1.5 Is space communicated clearly and connected accurately (e.g. transitions)?
- ☐ 1.6 Is it easy to link different types of functionalities and information to a position in the spatial layout?
- ☐ 1.7 **Middleworld**: Is relevant information available to the naked eye -meaning our unmediated senses- or does the user have to know and be prepped in advance?

2. Objects

- ☐ 2.1. Object constraints and dynamics
- ☐ 2.2. Causality and agency
- ☐ 2.3. Do the different parts of the user interface easily stand out as different when squinting the eyes?
- ☐ 2.4. The elements that are connected or related to each other, are they communicated clearly as connected or related?
- ☐ 2.5. Are options and differences clearly separated (e.g. the multiple log in the example)?

Design Driver 2: *Congruence and Redundancy*

Main questions to consider:

- ➡ Does the user interface tell the same story across all layers?
- ➡ Is there unintended information in the basic layers that conflicts with higher-order symbolic information?
- ➡ Is it possible to supplement important information with redundant information?

1. Congruence

- ☐ 1.1. Does the embodied information match the symbolic information? Is the information congruent?
- ☐ 1.2 Are visual object properties correctly used to support the intended cultural information (e.g. small, medium, large)?
- ☐ 1.3. Consider how directions are used (up, down, left, right, in, out, back, forth, etc.) and how these map the visual components in the GUI / labels / industrial design.
- ☐ 1.4. Do labels and wording match what the user can see and experience?

2. Redundancy

- ☐ 2.1. Is the symbolic/semantic communication supported by a redundant visual message (which is congruent)?
- ☐ 2.2. Is the symbolic/semantic message supported with inherent embodied communication ?
- ☐ 2.3. Use redundant symbolic/semantic information (e.g. icons with text labels).
- ☐ 2.4 Connect different elements in the visual layout with redundant information (physical and graphical) using resources such as proximity, grouping, connector lines, numbers and styling.

Design Driver 3: *External Cognition*

Main point to consider:

➡ All four cognitive levels can be supported with external cognition.

➡ Especially look for ways to unburden higher-order cognitive skills (level 3+4).

1. Higher-order cognitive external cognition

- ☐ 1.1. Make the information needed to understand each part of the system and/or screen directly available.
- ☐ 1.2. Focus especially on states and modes of the system that should be directly available and that do not require the user to know or remember them.
- ☐ 1.3 Error messages are a particular case. They should help the user resolve the problem.
- ☐ 1.4 Digest information into meaningful categories and units relative to the user task at hand.
- ☐ 1.5 Enrich information with contextual information relative to the user task at hand (e.g. diagnostic decision support).
- ☐ 1.6 Support the “why”, “what” and “how” level activity.

2. Basic cognitive external cognition

- ☐ 2.1. Avoid the need for fine motor control.
- ☐ 2.2. Provide guiding information at the motor level (e.g. insert syringe/power plug).
- ☐ 2.3. Provide correct (inherent) information that does not need intellectual override (e.g. machine sounds).
- ☐ 2.4. Make it easy to do it right. Build in protective features at the handling level (e.g. barcode case).
- ☐ 2.5. Reduce degrees of freedom in motion.
- ☐ 2.6. Provide reference examples.

Design Driver 4: *Match Mental Models*

Main questions to consider:

- ➡ Which mental models are likely for the user to have? How can they be factored in?
- ➡ How can the desired mental model be activated (through priming)?
- ➡ Are there incorrect mental models that should be avoided?

1. Primary embodied image schemas

- ☐ 1.1. Does the design match the basic embodied intentionality of the user (e.g. power drill in and out)?
- ☐ 1.2. Are there basic embodied relationships (up-down, front-back etc.) that can be mapped in your design?
- ☐ 1.3. is there a "natural" way for you to interact with the object? (e.g. how you apply force pulling things apart horizsntally).

1. Metaphors

- ☐ 1.1. Are you using metaphors consistently in your written communication (crime as beast/ virus)?
- ☐ Are you using consistent visual metaphors?
- ☐ Are you priming the user with certain mental models (e.g. Speedicath handling)?
- ☐ Are you using a clear mental model or is it “bi-polar” (e.g. Speedicath lipstick vs. mascara)?

2. Scripts

- ☐ 2.1. Can you utilise an existing familiar script (e.g. the airport script for SDCC or the web-shop script for social services at KMD)?

Design Driver 5: *Consistency, Optimisation and Simplicity*

Main questions to consider:

- ➡ How can the overall intellectual burden be reduced?
- ➡ What can be cut away? What is unnecessarily cumbersome?

1. Consistency

Ensure consistency throughout the system and across all touchpoints (physical, digital, print, person).

- ☐ 1.1. Button placement consistency throughout the system.
- ☐ 1.2. Interaction design consistency throughout the system.
- ☐ 1.3. Wording and labelling consistency through the system.

2. Optimisation

- ☐ 2.1. Ensure that learned interaction logics are uses in the same way through the design (e.g., the many ways of deleting in the iPhone OS, Odder Barnevogn).
- ☐ 2.2. Create classes of icons that visually relate to each other. Instead of 40 unique icons, use the icon family design approach.
- ☐ 2.3. Communicate the same information using the same logics. Dont shift visual format and information structure (Tre/3).

3. Simplicity

- ☐ 3.1. Design all of the elements of the user interface (inside, outside, front and back).
- ☐ 3.2. The user interface is for the user. Get rid of information that the user does not need.
- ☐ 3.3. Stage information as a narrative that unfolds - don't present everything at once.
- ☐ 3.4. Use lingo/wording that the user knows.

Design Driver 6: *Standards - Formal and Informal*

Main points to consider:

- ➡ Identify which formal standards apply to your product domain.
- ➡ Identify which informal standards exist in your user/customer group and explore if they could benefit from them.

1. Formal standards

- ☐ 1.1. Human Factors Standards: AAMI/ANSI HE75:2009
- ☐ 1.2. SO/IEC 62366:2007- Medical devices – Application of usability engineering to medical devices
- ☐ 1.3. ANSI/AAMI/ISO 14971:2007 Medical devices – Application of risk management to medical devices.
- ☐ 1.4. https://developer.apple.com/design/human-interface-guidelines/
- ☐ 1.5. https://material.io/design/
- ☐ 1.6. https://docs.microsoft.com/en-us/windows/win32/uxguide/controls

2. Informal standards

- ☐ 2.1. Look for “mega" standards (Google, Facebook, LinkedIn).
- ☐ 2.2. Standards in product categories like newspaper layout, IKEA assembly guides, LEGO .
- ☐ 2.3. Look for pop-cultural standards in movies and TV-series.
- ☐ 2.4. Daily product categories (bottles, boxes, packages, etc.)

Design Driver 7: *Awaring*

Main questions to consider:

- ➡ Is there a need for the users to shift their full conscious focus to a particular aspect of the design or contextual setting?
- ➡ Has something changed in the design that violates what the user will likely have as an automated routine?

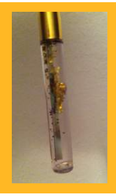
Awaring methods (from IQ to bodily)

- ☐ 1. Create conceptual blends by mixing objects from two different contextual domains.
- ☐ 2. Use visual illusions that have a "pop-out" quality.
- ☐ 3. Attract attention with "objects out of place" (fly on urinal, coffee stain on invoice, deliberate misprints).
- ☐ 4. Create physical barriers to activity.
- ☐ 5. Full body "shake-up".

Overview of Design Driver Lenses

Match Mental Models

Make explicit & consistent mental model in product that matches the users' mental model. Build on conceptual models users' already have. Make these (just one) explicit in the product. Make it consistent. Like a good speech that uses a powerful metaphor consistently.



External cognition

Make it easier to do it right. Guide the interaction. Design constraints and feedback & feedforward into the product

small
medium
large

Congruence & redundancy

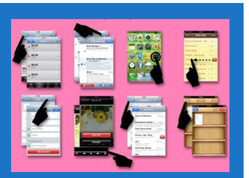
Tell the same story at all cognitive layers. Create redundancy in communication with multiple layered information.

Embodiment

Make relevant information DIRECTLY perceivable (non-symbolic). Think analog information rather than symbolic digital. Create embodied direct couplings in product. Avoid separations in time and space between functional related elements.

Optimisation & consistency

Simplify processes, create consistency, make it efficient, cut to the bone. Make the product heterogeneous.



Standards

Build on what the users already know. Abide to standards. Follow ISO and existing de-facto standards that users are naturally exposed to in their daily lives.

Awarering

With careful obstructions critical interaction can be relegated to conscious awareness. Short circuit automatic responses and break routine when they are undesired.

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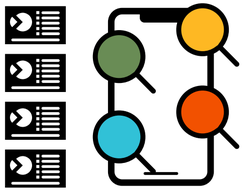
Analysis Templates

- UX Expert Review

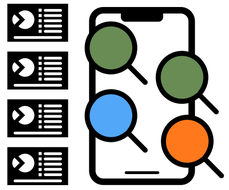
Report Structure

We recommend that you structure your report by grouping findings around individual parts of the design rather than the design drivers themselves.

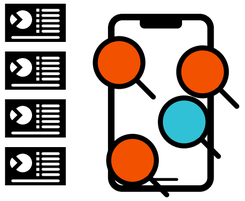
Screen A
Slide 1-4



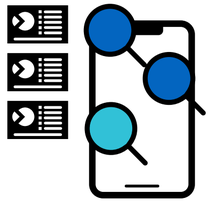
Screen B
Slide 1-4

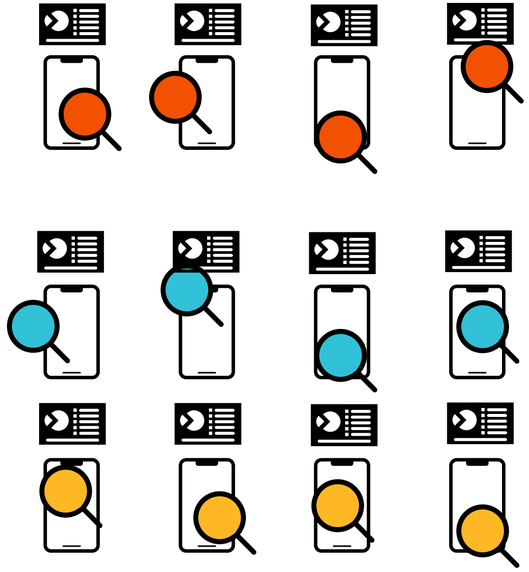


Screen C
Slide 1-4



Screen C
Slide 1-3





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Example

Problem Description

The graphical design communicates to the user that everything you see is what there is.

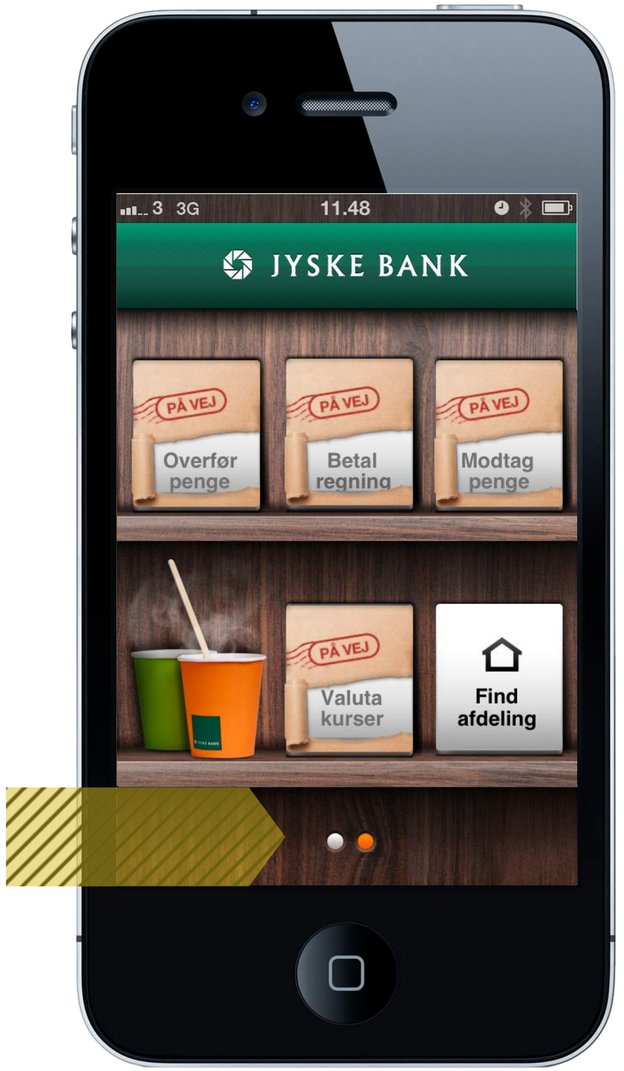
The page symbols at the bottom of the screen are easily overlooked. Also, the tap into linguistic intellectual ressources.

Root cause & design solutions

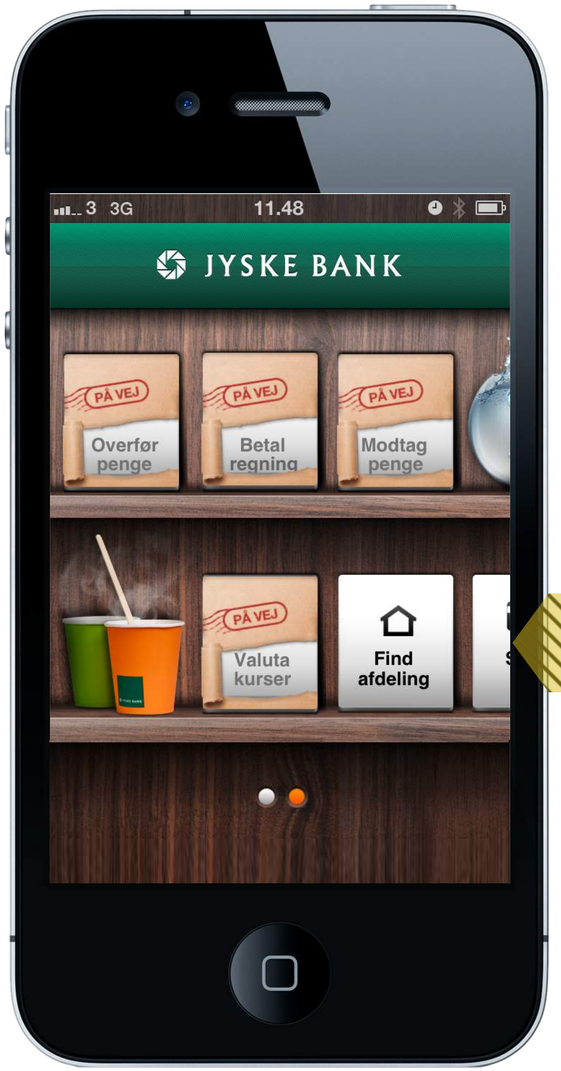
To support embodied cognition (Design Driver 1) an option could be to show objects &/ function on the bookshelf that are half occluded by the screen.

This would communicate to our basic object perception cognitive skills that "there is more to the right".

Current design



Re-Design



Headline With Problem Description [Smartphone GUI]

Problem Description

Here you include a small description of the design problem from the user's perspective.

Use the arrows to highlight the area of interest.

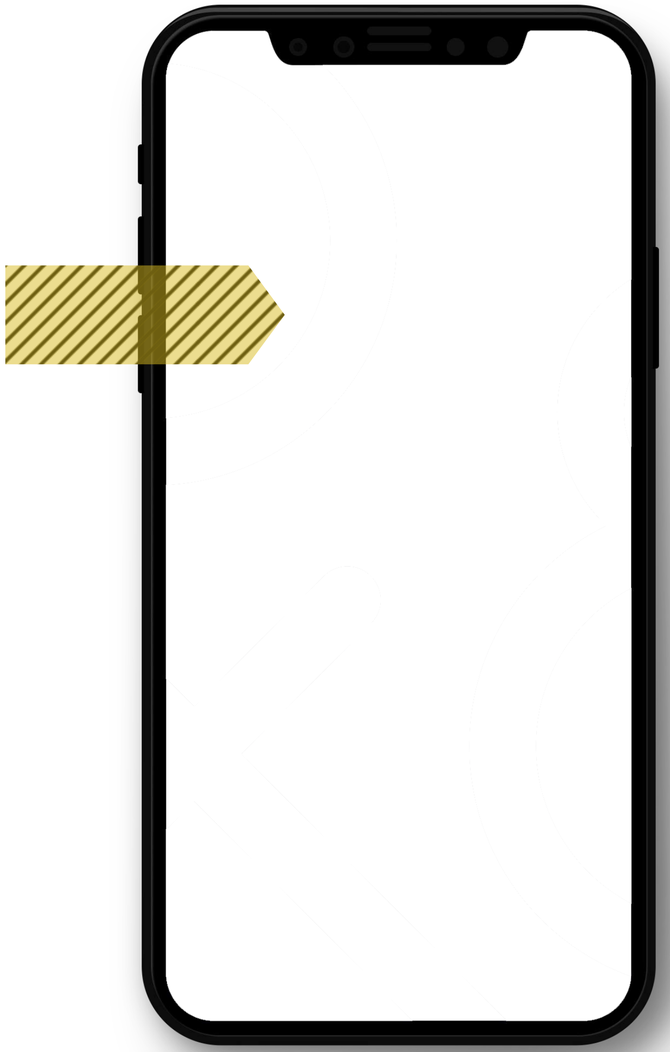
Root cause & design solutions

Here you provide a root cause analysis of the design problem using the relevant design driver(s).

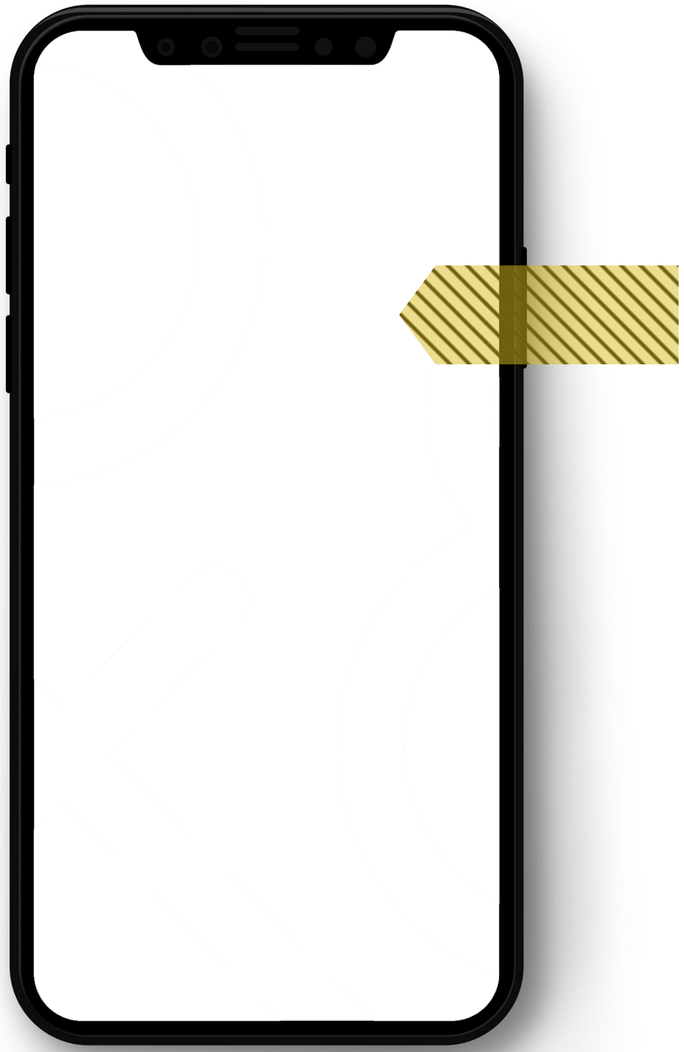
Also, describe the background for the design mitigation you suggest (the design hack).

NOTE!
Only present one issue per slide

Current design



Re-Design



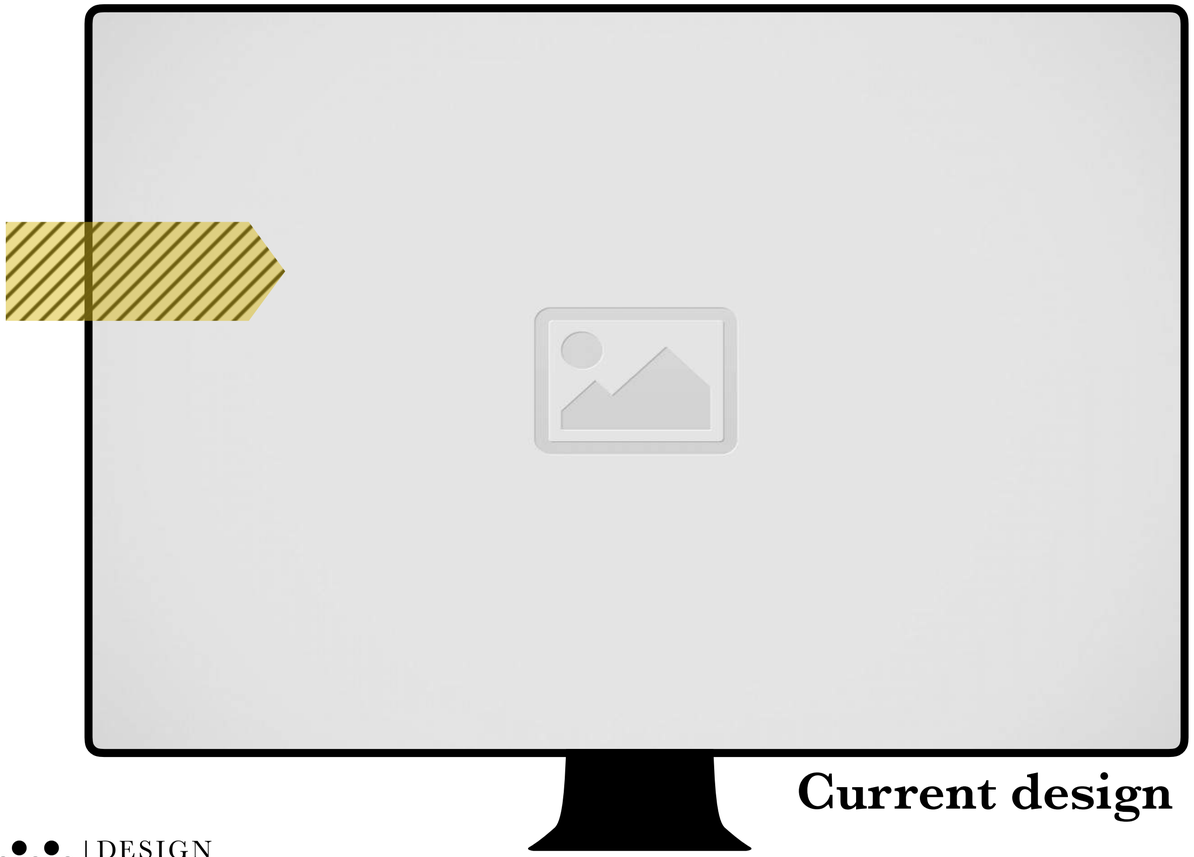
Headline With Problem Description [Computer Software]

Problem Description

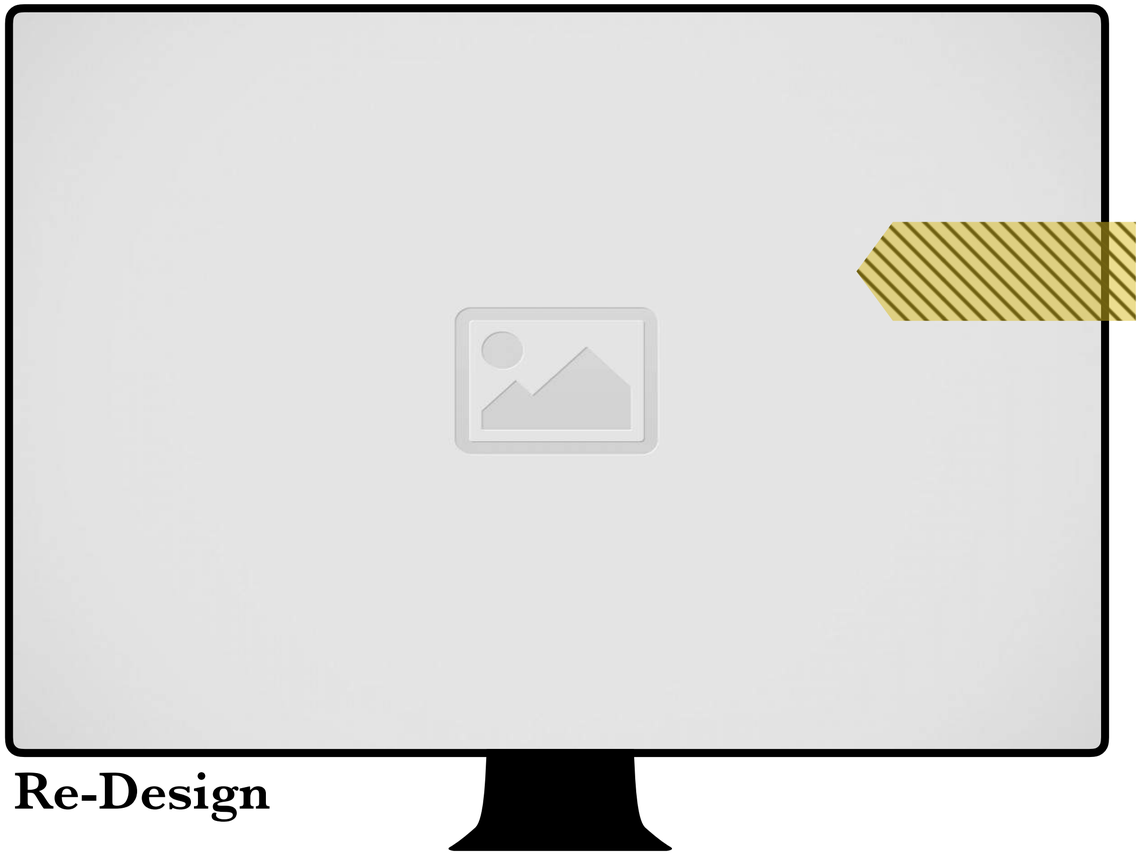
Here you include a small description of the design problem from the user's perspective.

Root cause & design solutions

Here you provide a root cause analysis of the design problem using the relevant design driver(s). Also, describe the background for the design mitigation you suggest (the design hack).



Current design



Re-Design

Phase 3:
Reporting and Design Solutions

It can be tempting to just send a report based on the UX Expert Review. However, Phase 3 should be considered as a guided co-creation process where the issues, found in the analysis, are taken as a departure point for discussing feasible solutions.

Even though you already provided design hacks as potential solutions, these should be considered more as a way to communicate the logic of the problem based on the design driver.

It may be that the example you provided is directly implemented - that is just great. Yet, usually we design entirely new solutions together with the team that participates in the presentation.

The presentation also provides an opportunity to anchor the design drivers with the design team. While you may have to spend some hours with the design during the analysis, the design will spend many weeks and months from here on with the team. They should therefore be empowered to see through and resale the value of the analysis.

The more ownership and understanding you are able to create at the presentation, the better.

God luck with your first review!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