Interaction Design Research
sharing data on
Large-Screens

What is Interaction Design Research?
Why large screens?
The research process, examples, contributions.
Value for Human Factors approaches

Large-screen displays, what & why?

- Human scaled display
- Available through new technology
- A group-view display for shared Situation Awareness

Unfortunately often only up-scaled......there is a need for design research
Limiting the scope: industrial processes

Research Question: how to design for the “keyhole” effect? \cite{Woods1995}

- Fragmented view
- Loss of Awareness
- Tool induced activity

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Research Question: How to design for rapid perception of data?

“Wicked problem”

- No definitive formulation
- No stopping rules
- Solutions not true or false
- Depending on preferences
- No definitive test

The operator is a complex system, with capabilities and limitations

Suitable for Interaction Design Research
Three different types of Interaction Design Research

Research **about** design  
History of design, theory, defining and framing problems, how people do design

Research **through** design  
Provide explanation or theory within a broader context, action reflection approach

Research **for** design  
Construct something; action research; design practice; user testing

My contribution is “**research for design**”

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What is Research **for** Design?

Interaction Design Research is **not** a method

Design Practice
Skills, perform design, reflection

Design Exploration
Small-scale to full scale prototypes, “how does it work? Feedback from users

Design Studies
Scholar theory, visual perception; scientific studies, industrial guidelines

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Design Studies

Stage 1: Low-level features
Stage 2: Filtering-out patterns
Stage 3: Visual working memory

Visual memory
Attention
Visual pop-out
Visual hierarchy

Design for “information in the world”

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Ware (2013); Healey & Enns (2012)
Visual pop-out

Find:

Design for distinct feature channels

Attention

Movable graphics “grabs” attention
Visual hierarchy

Designing for foreground - background

Small-scale exploration of indicators

- High accuracy
- Direct perception
- Direct perception, natural metaphor
- Direct perception, natural metaphor, dynamic response

based on: ASM-consortium guidelines (2013, p. 93)
Information Rich Design

1. Trended graphics

2. Goal directed, set-point and alarm limits

3. Automation visualized qualitatively

4. Alarms, visual pop-out

Large-scale exploration of three whole designs

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User feedback: SUS-scores

- Halden-Reactor LSD   SUS: 83
- Replaced panels      SUS: 77
- Previous HAMBO LSD   SUS: 59

User feedback: perceived awareness

The design concept has matured, it is suitable for real-world installations
The rapid perception problem

Stable, externalized graphics
Visual pop-outs
Open areas, scaled backgrounds, lines
Automation, set-points, alarm constraints

The keyhole effect

Visual memory
Bottom-up attention
Top-down search
Goal oriented

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Contribution is research for design

Graphics components and principles for their layout

Further work........

Summary

- Complex real world “wicked” problems
- Approached through Interaction Design Research

• Outcome is research “for, about, through” design

What about Human Factors?
Projects focusing on creating designs

Creating design:
An integrative discipline

Interaction Design

Human Factors

Analyzing design:
A reductionistic discipline

Interaction Design
Creative Process

Establish a design team

Prototyping, sketching

Refine iteratively, evaluate

Review the end product.

Implement, review the whole process

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Human Factors and Interaction Design compliment each other

Discussion?