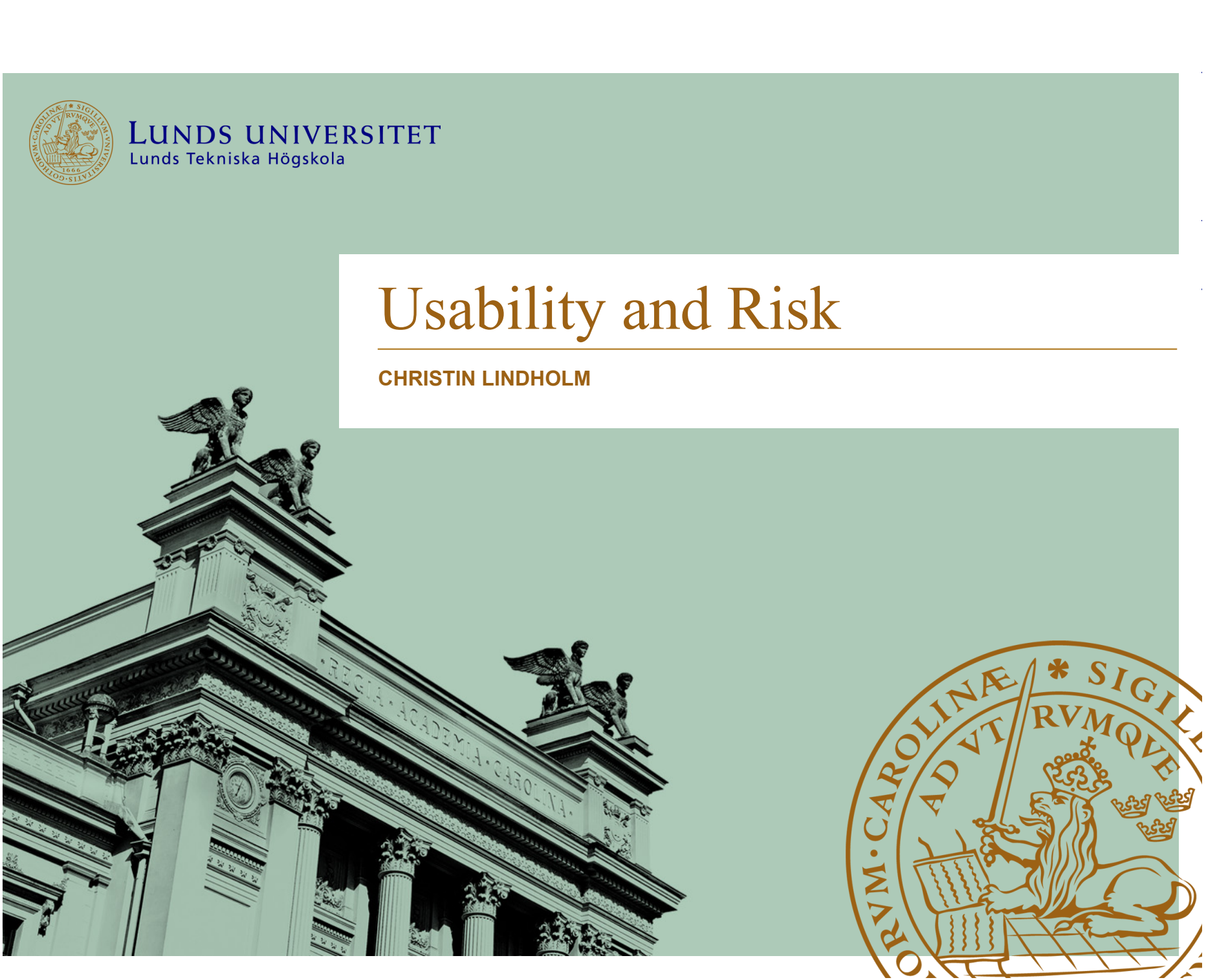

LUNDS UNIVERSITET
Lunds Tekniska Högskola
Usability and Risk
CHRISTIN LINDHOLM
REGIA · ACADEMIA · CAROLINA
SIGILLVM · VNIVERSITATIS · GOTHORVM · CAROLINÆ
AD VTRVMQVE

Software Engineering Research Group
Department of Computer Science
Lund University

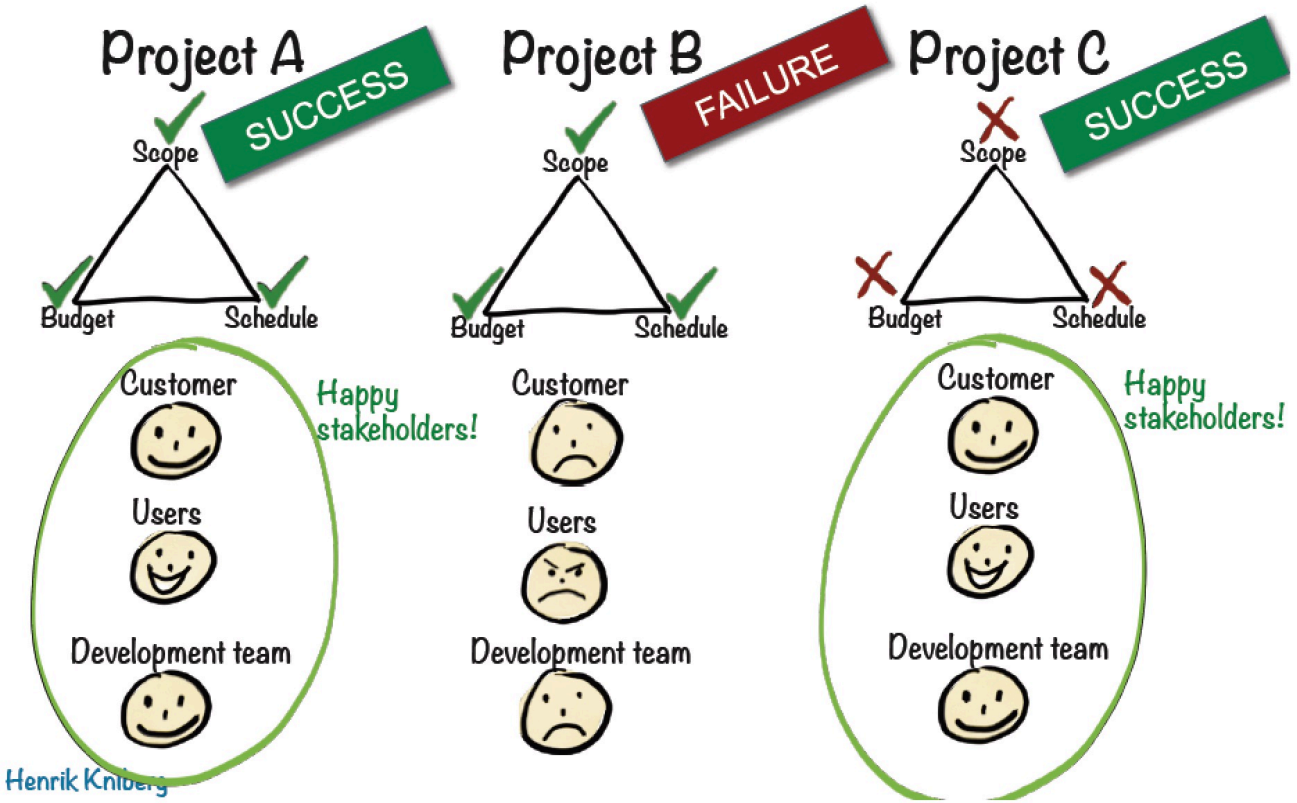
SERG

Research – software development in the domain of safety critical medical devices and medical systems.
Focus on usability and risk

What to expect from today

- Usability
- Risk
- Involve users
- Practice
- Safety critical software and usability in production equipment

What is a successful project?



Av Henrik Kniberg

Users Award

User organisation that works for better IT support in working life.

Survey showed

Seven out of ten respondents believe that:

- The introduction of the system does not happen with sufficient involvement from users and activities
- Users' suggestions for improvements are not taken advantage of.
- Most users are dissatisfied with how the computer system facilitates work or contributes to the benefit of the business

Cambio Healthcare systems

- One patient – one medical record
- With a single click you reach medical records, referrals, medical prescriptions
- Very successful in Sweden

Fault, failure, bugs…

- 1800 error reports during 2 years from one hospital

Examples

- Answers from blood tests etc. disappeared
- The patient incorrectly marked as deceased
- Medical notes ended up in the wrong record
- Dosages reversed on e-prescriptions
- Performance issues
- To many “clicks” in the application

Usability

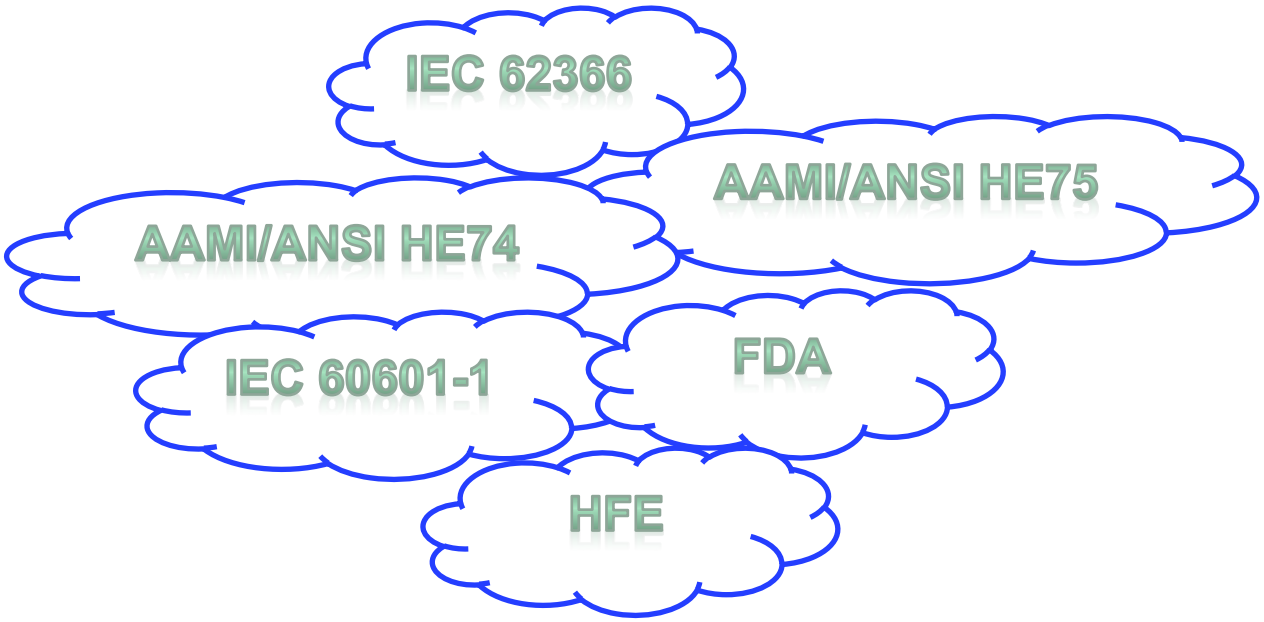
- ✓ **Relevance**. Supports tasks?
- ✓ **Efficiency.** Fast and problem-free?
- ✓ **Availability.** Easily find the necessary information?
- ✓ **Learnability.** Easy is it to learn for a beginner? Remember later?
- ✓ **Attitude.** Subjective satisfaction.

Usability Factors

Usability = **Fit for use = tasks covered** + **Usability Factors**

Functional requirements

Usability



Must have risk management

Combine?

Risk management method involving the USER

Software development

Medical devices

How usability testing can contribute to the risk management process

- What **type** of problems and risks can be identified through usability testing.

- If the problems and risks are the **same** identified through usability testing the risk management process.

Risk

"Combination of the probability of occurrence of harm and the severity of that harm"

ISO 14971:2012

User scenarios and intended users in the risk management process

Risk value = probability x severity

Testing the device on the user

≈ 5 test users -> 80 % possible findings

4-5 users

Usability test 1

2 nurses
2 enrolled nurses
Age 26 - 33

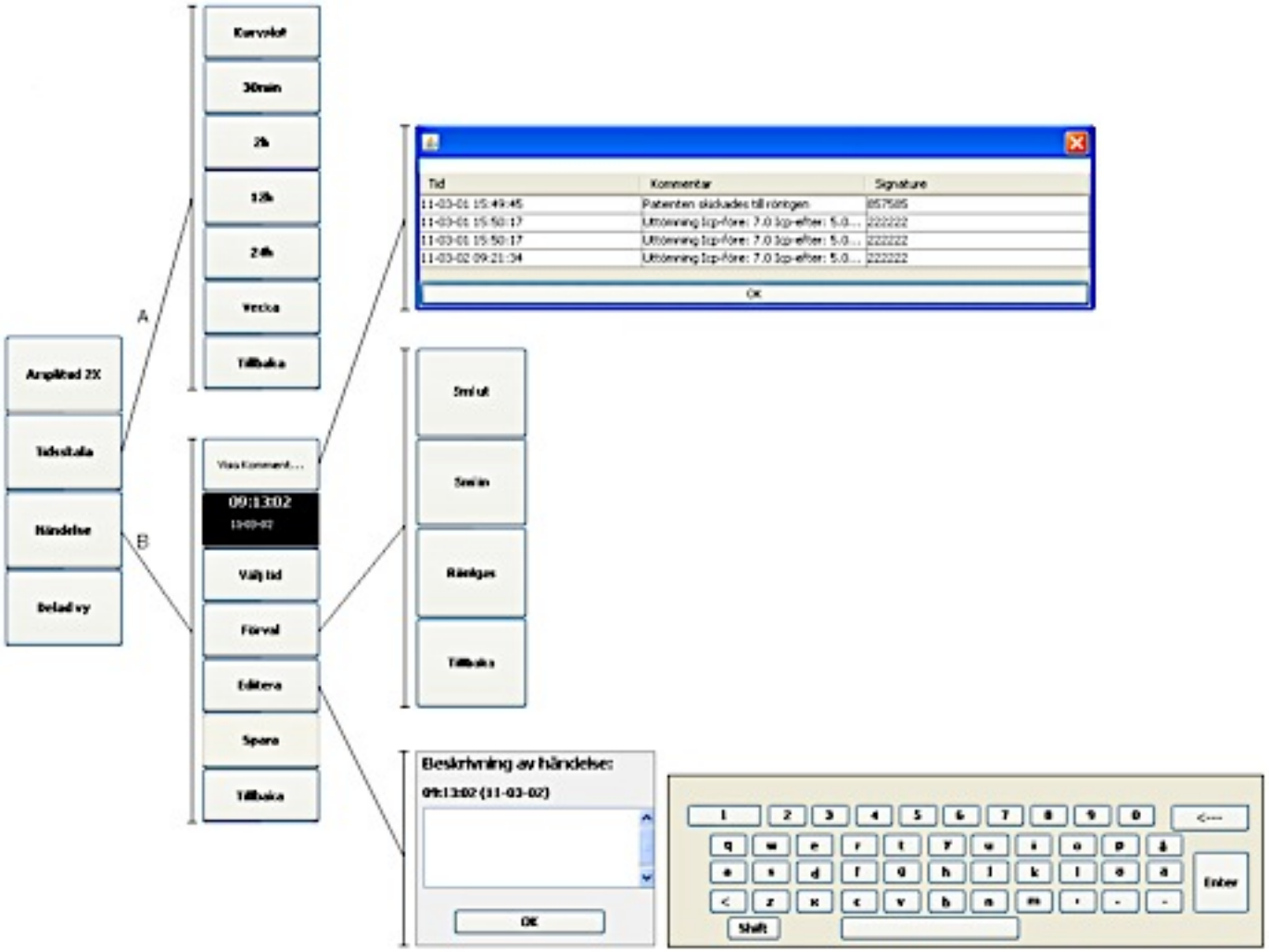
12 usability problems

Usability test 2

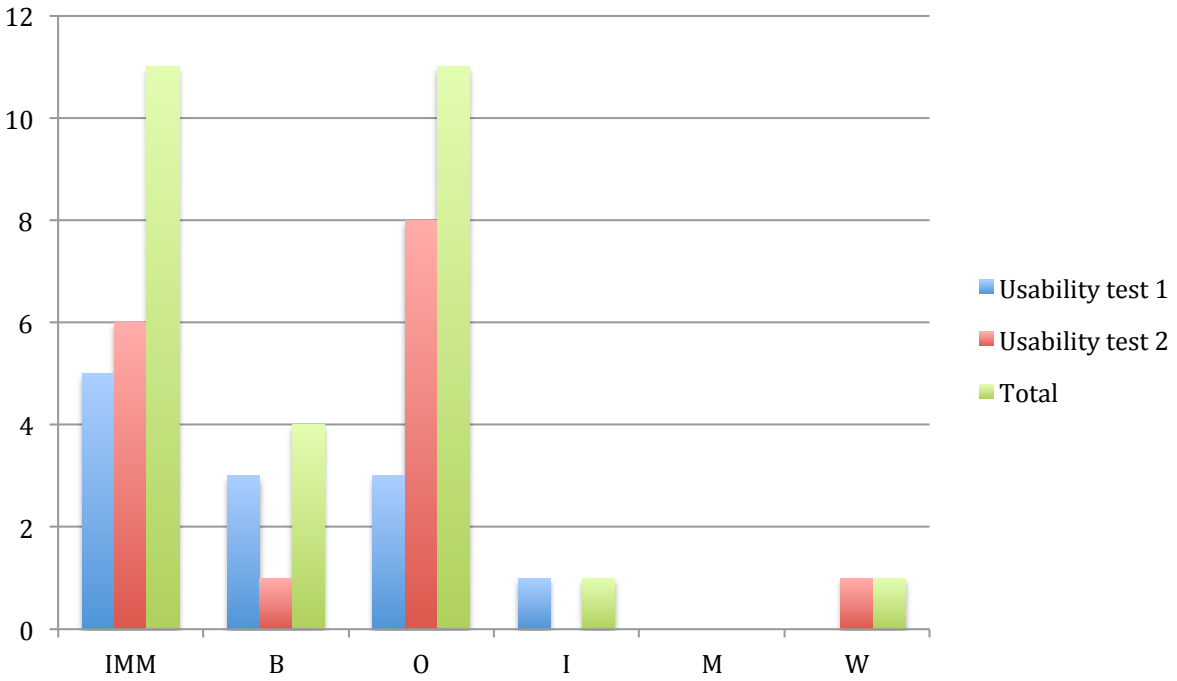
3 nurses
2 enrolled nurses
Age 31 - 51

16 usability problems

26 unique usability problems


Kurvvisf
30min
2h
12h
24h
Vecka
Tillbaka
A
Återställ 2X
Tidsskala
Händelse
Beladvy
B
Visa Kommentar...
09:13:02
Välj tid
Förval
Editera
Spara
Tillbaka
Tid
Kommentar
Signatur
11-03-01 15:49:45
Patienten skickades till röntgen
857685
11-03-01 15:50:17
Utlösning Icp-före: 7.0 Icp-efter: 5.0...
222222
11-03-01 15:50:17
Utlösning Icp-före: 7.0 Icp-efter: 5.0...
222222
11-03-02 09:21:34
Utlösning Icp-före: 7.0 Icp-efter: 5.0...
222222
OK
Smi ut
Smi in
Rängas
Tillbaka
Beskrivning av händelse:
09:13:02 (11-03-02)
OK
Enter
Shift

IMM and O - type of problems and risks identified through usability testing.

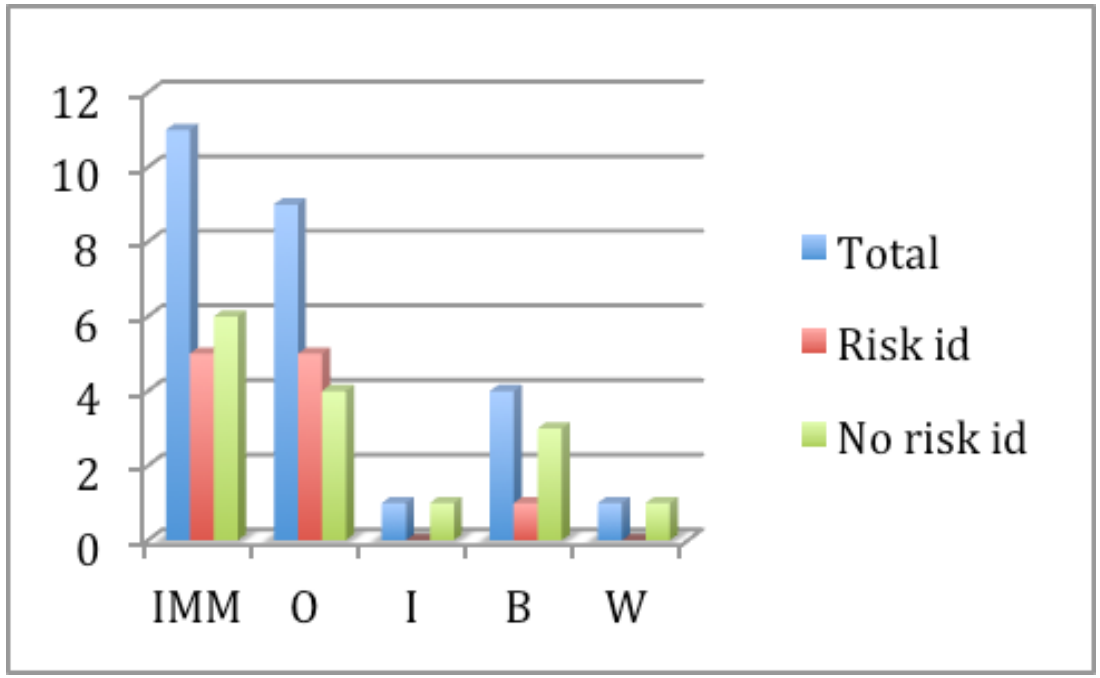


IMM – **I**ncongruent **M**ental **M**odel

O - **O**verlook

New problems and risks was identified through usability testing

≈ 58 % of the usability problems - **not** identified as risks



IMM – **I**ncongruent **M**ental **M**odel

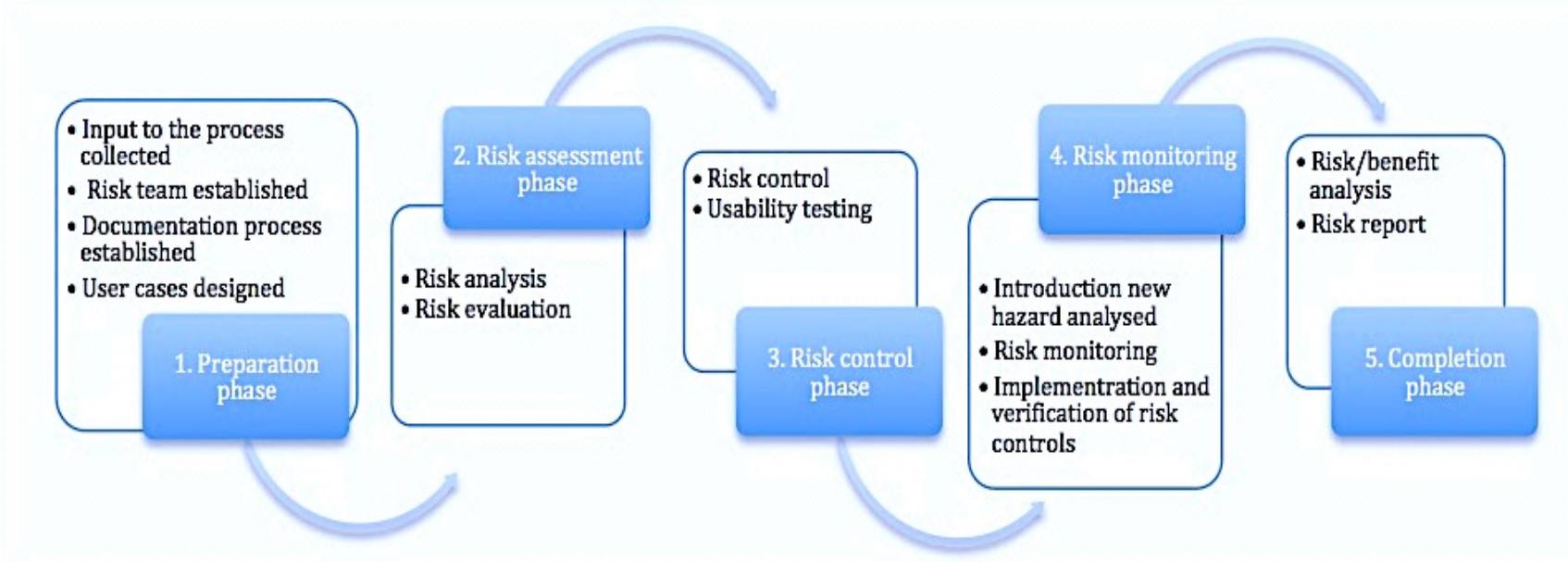
Some risk values should be higher and some lower

≈ 42 % of the usability problems - identified as risks

The usability testing can contribute to the risk management process

- Catch problems depending on different mental model
- Catch “good” risk candidates
- Identify “problem functions”
- Avoid unnecessary changes

RiskUse


• Input to the process collected
• Risk team established
• Documentation process established
• User cases designed
1. Preparation phase
2. Risk assessment phase
• Risk analysis
• Risk evaluation
• Risk control
• Usability testing
3. Risk control phase
4. Risk monitoring phase
• Introduction new hazard analysed
• Risk monitoring
• Implementration and verification of risk controls
• Risk/benefit analysis
• Risk report
5. Completion phase

How to elicit information

- “Speak” to users/customers/stakeholders
- Interviews
- Prototypes
- Observations
- Focus groups
- Workshops
- …

Who are the users?

- Identify the different users/user groups
  - Describe them ("get to know the")
    - Needs/problems
    - Goals
    - Domain knowledge
    - Technical background/skills
    - Characteristics
    - Relevant behaviour
    - Requests
    - Priorities
    - Limitations
    - Attitude

Who are the users?

- Online bookstore store
  - Sells all types of books
  - New and second hand

- Get together in groups
- Discuss and identify different users

Usability problems

Examples of usability problems

P1: User takes long time to start search. Doesn‘t notice “Use F10”. Tries many other ways first.

P2: Believes task completed and result saved. Should have used *Update* before closing.

P3: Cannot figure out which discount code to give customer. Knows which field to use.

P4: Crazy to go through 6 screens to fill 10 fields.

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Usability requirements

R1: The system shall be easy to use

R2: 4 out of 5 new users can book a guest in 5 minutes,. . .
New user means . . . Training . . .

Achieving usability
- Prototypes (mockups) before programming.
- Usability test the prototype.
- Redesign or revise the prototype.

Easier programming. High customer satisfaction.

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Discuss

- Who are your users? Different groups / types of users?
- What characterizes your different users?

- How do you / would you like to involve users in the development process?

- Are there any barriers to involving users? Which?

Thank you!

”To err is human, but to really screw up, you need a computer”

Richard A. Schrenker