

Human Error? No, Bad Design

Lecture 08 of *Researching People-Centred Design* with Tim Maciag



University
of Regina

Faculty of
Engineering and
Applied Science



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Outline

- Primer
- Understanding errors
- Designing for errors
- Design principles

Primer to Human error? No, bad design

- Three Mile Island Accident (Wikipedia). Online: https://en.wikipedia.org/wiki/Three_Mile_Island_accident (Accessed Mar 2019)
- J. Nielsen (NN/g). Medical Usability (2005). Online: <https://www.nngroup.com/articles/medical-usability/> (Accessed Mar 2019)

Primer to Human error? No, bad design

- Industrial accidents & human error



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- Three Mile Island Accident (Wikipedia). Online: https://en.wikipedia.org/wiki/Three_Mile_Island_accident (Accessed Mar 2019)
- J. Nielsen (NN/g). Medical Usability (2005). Online: <https://www.nngroup.com/articles/medical-usability/> (Accessed Mar 2019)

Primer to Human error? No, bad design

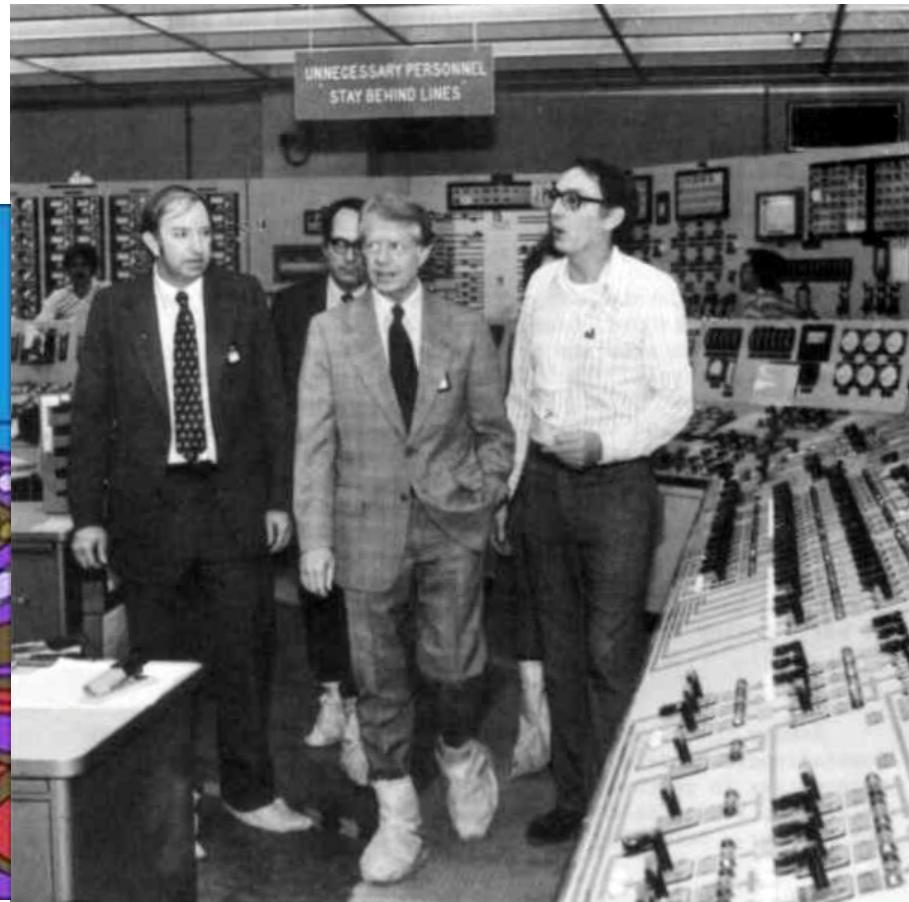
- Industrial accidents & human error
- Physical vs. mental limitations



- Three Mile Island Accident (Wikipedia). Online: https://en.wikipedia.org/wiki/Three_Mile_Island_accident (Accessed Mar 2019)
- J. Nielsen (NN/g). Medical Usability (2005). Online: <https://www.nngroup.com/articles/medical-usability/> (Accessed Mar 2019)

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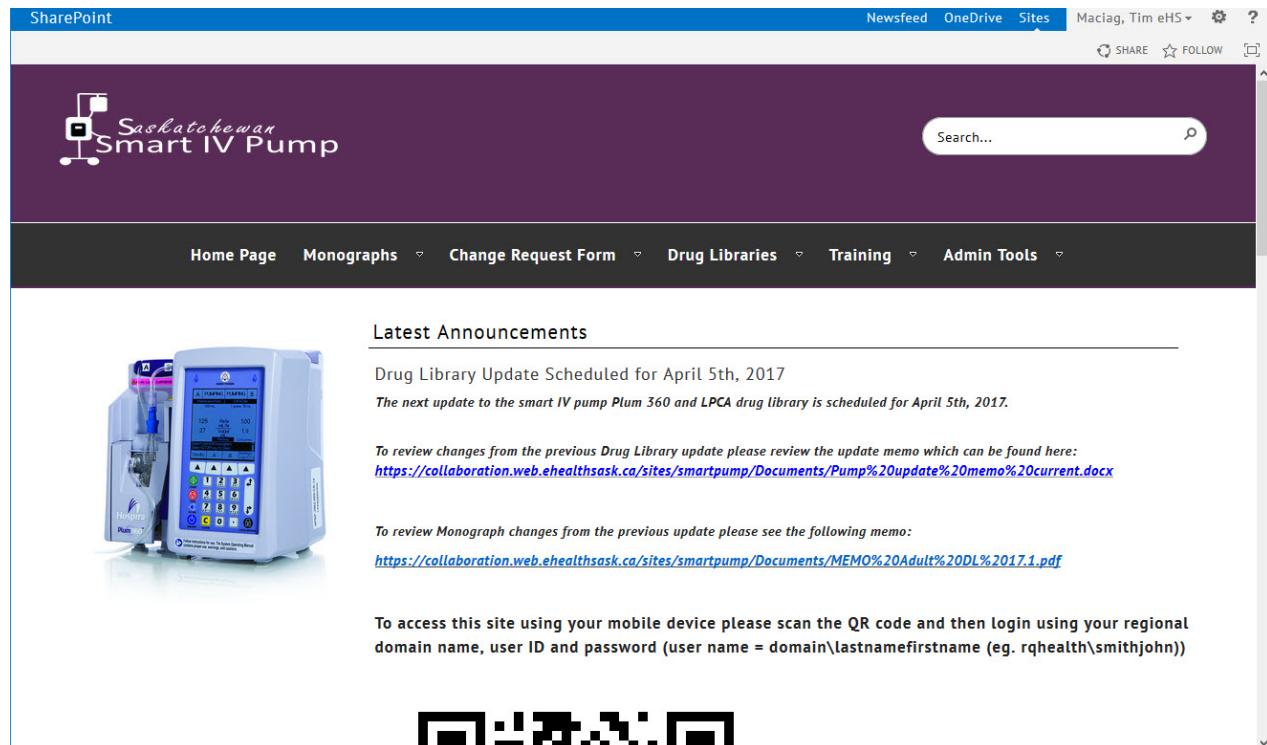
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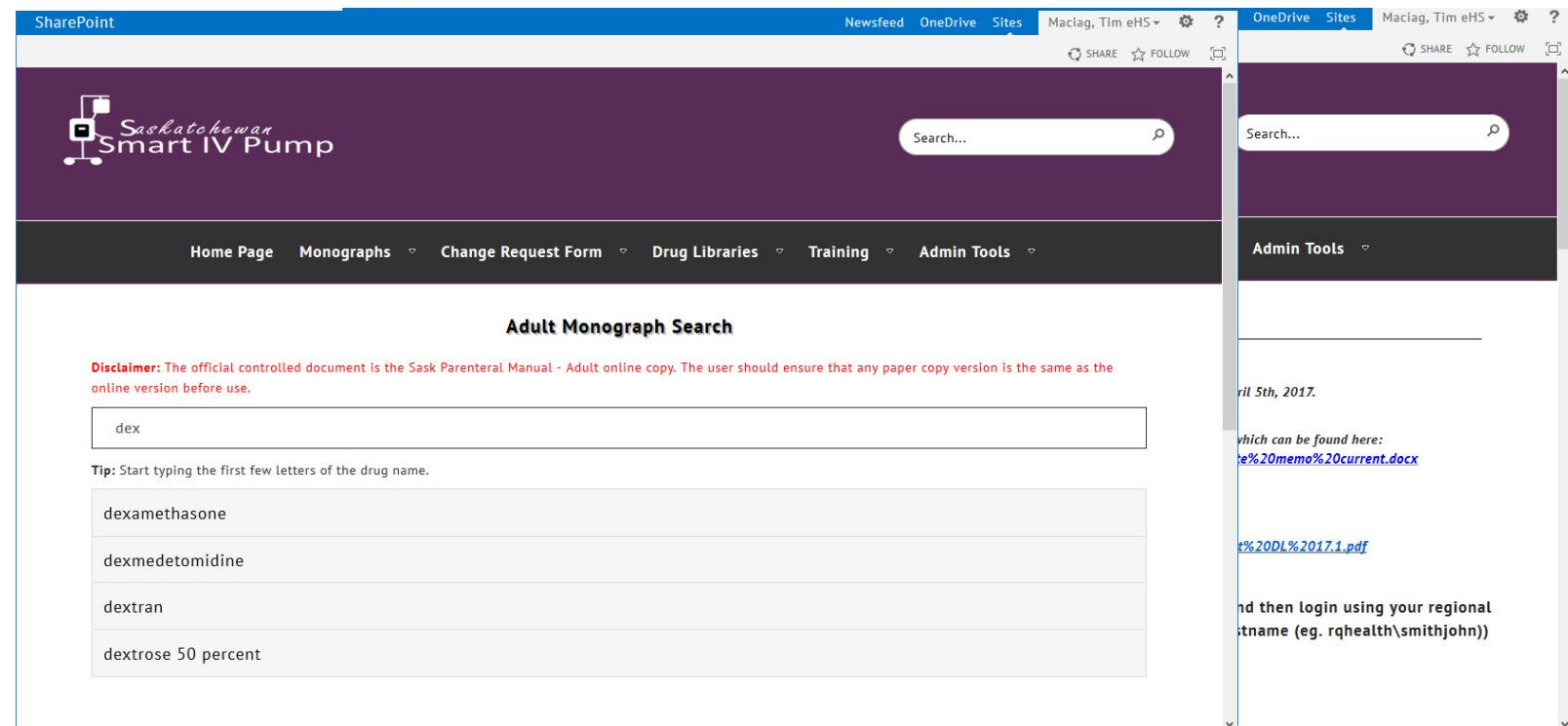
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Primer to Human error? No, bad design

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The image displays three side-by-side screenshots of a SharePoint-based application. The left screenshot shows the main 'Saskatchewan Smart IV Pump' page with a navigation bar for Home Page, Monographs, Change Request Form, Drug Libraries, Training, and Admin Tools. Below the navigation is a message about completing a change request form. The middle screenshot shows a 'Change Request Form' page with fields for Title, First Name, Last Name, Email Address, Work Phone Number, Health Region/Agency, Facility and Ward, Manager's Name, and RHA/Agency Smart Pump Program Liaison Name. The right screenshot shows a 'Change Request Form' page with a large text area containing instructions and a link to a document.

SharePoint Newsfeed OneDrive Sites Maciag, Tim eHS ?

Saskatchewan Smart IV Pump Search...

Home Page Monographs Change Request Form Drug Libraries Training Admin Tools

Complete the following form to request a change to the Saskatchewan Provincial Drug Library or a Parental Monograph. Please review the Change Request Form Algorithm prior to completing the change request form.

Saskatchewan Change Request Form

Title:

First Name: * Last Name: *

Email Address: Work Phone Number: *

Health Region/Agency: * Facility and Ward: *

Manager's Name: * RHA/Agency Smart Pump Program Liaison Name:

Search... SHARE FOLLOW

Newsfeed OneDrive Sites Maciag, Tim eHS ?

Search... SHARE FOLLOW

Search... SHARE FOLLOW

Braries Training Admin Tools

rch user should ensure that any paper copy version is the same as the

ril 5th, 2017.

which can be found here:
[te%20memo%20current.docx](#)

[%20DL%2017.1.pdf](#)

and then login using your regional
tname (eg. rqhealth\smithjohn))

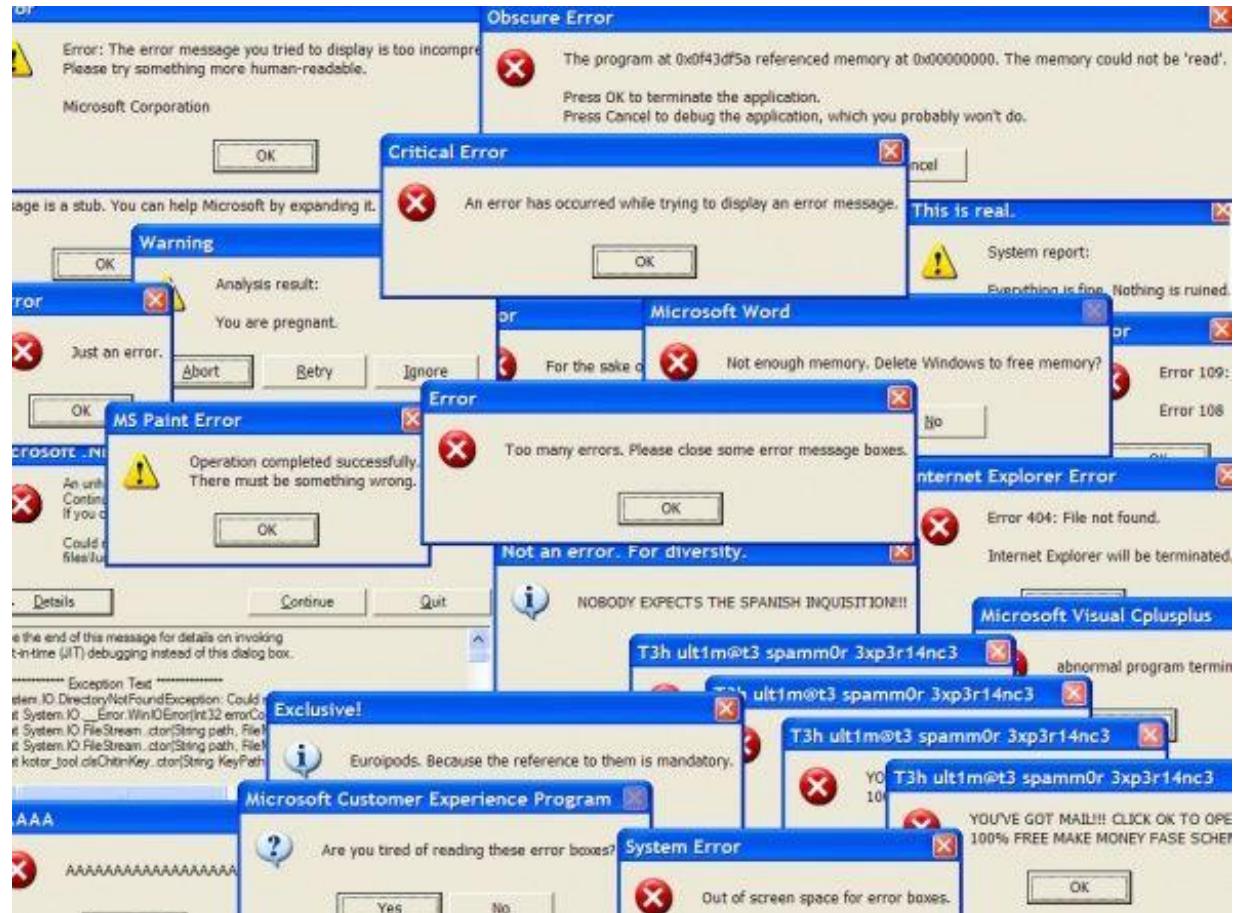
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Understanding why there is an error

- 2018 Hawaii False Missile Alert (Wikipedia). Online: https://en.wikipedia.org/wiki/2018_Hawaii_false_missile_alert (Accessed Mar 2019)

Understanding why there is an error

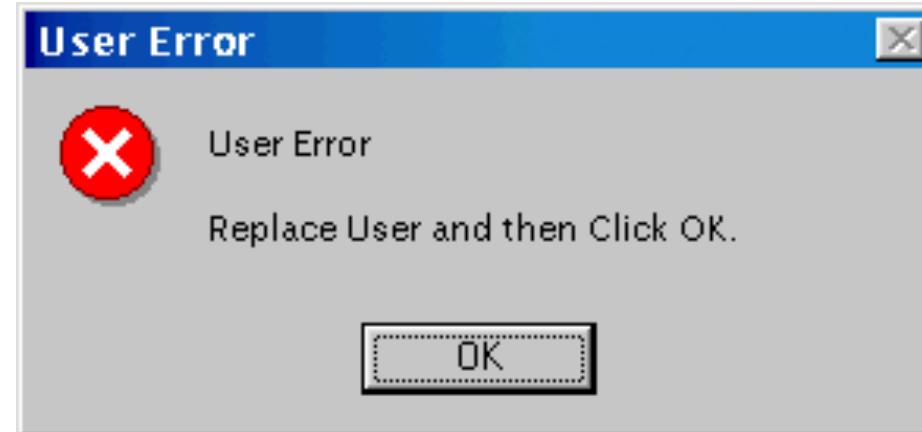
- Most common errors



- 2018 Hawaii False Missile Alert (Wikipedia). Online: https://en.wikipedia.org/wiki/2018_Hawaii_false_misile_alert (Accessed Mar 2019)

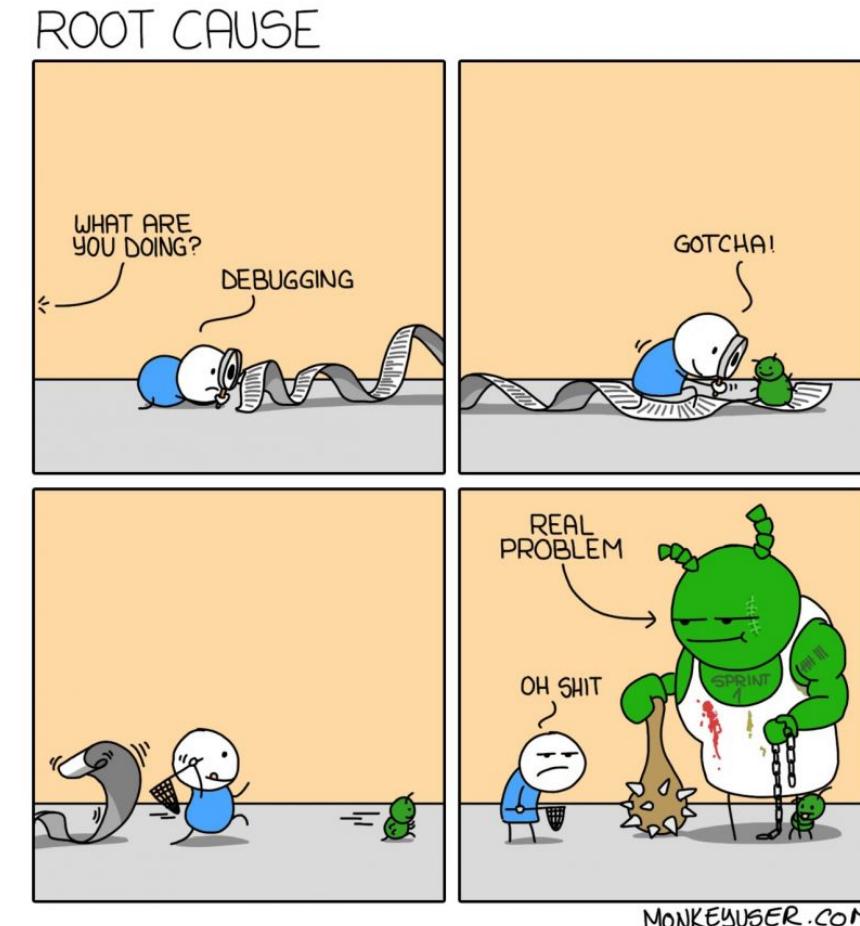
Understanding why there is an error

- Most common errors
- Blame & punish;
blame & train



Understanding why there is an error

- Most common errors
- Blame & punish;
blame & train
- Root cause analysis



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Understanding why there is an error

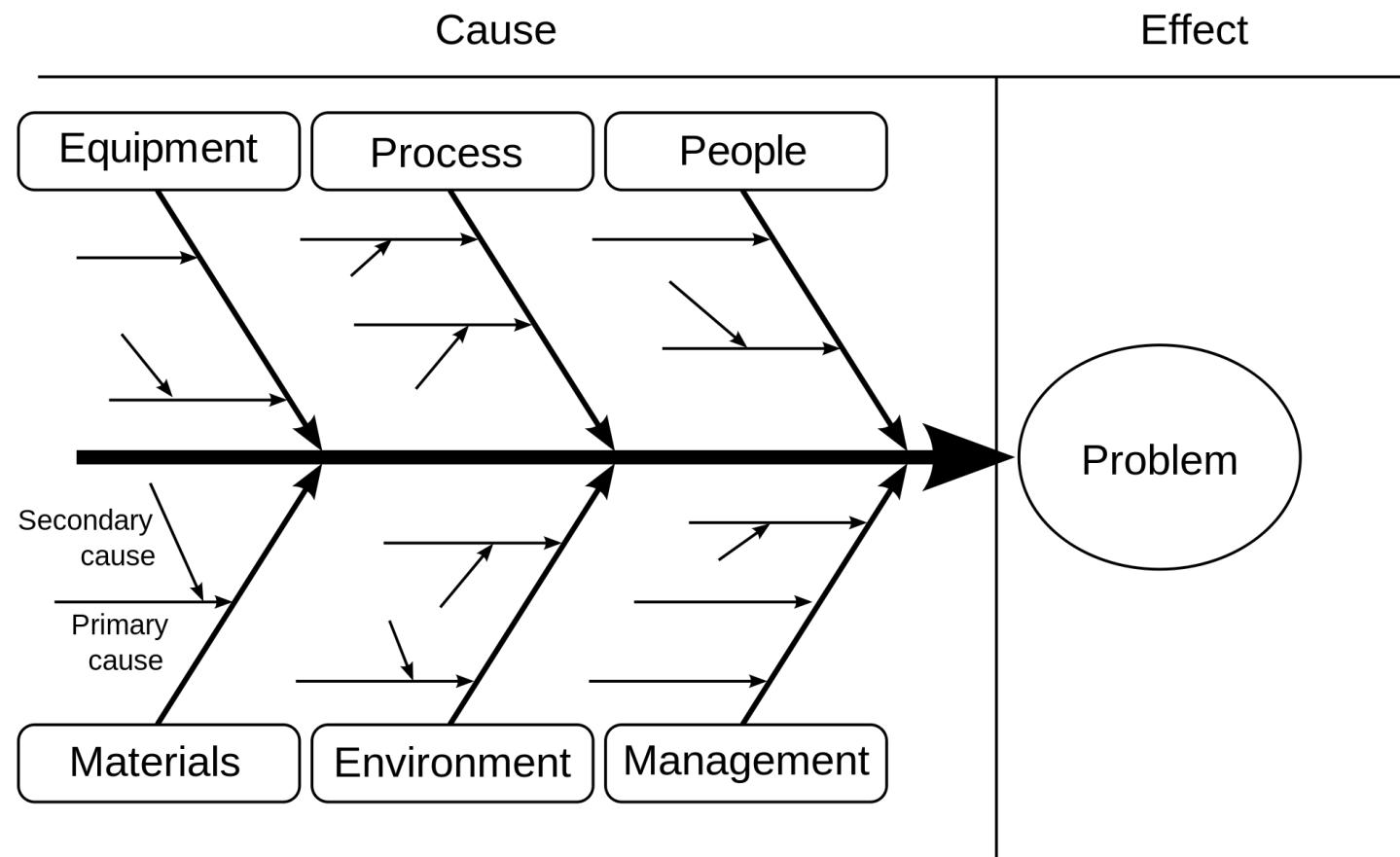
- Most common errors
- Blame & punish;
blame & train
- Root cause analysis
- The 5 whys

Five Whys	
Question	Answer
Q1: Why did the plane crash?	Because it was in an uncontrolled dive.
Q2: Why didn't the pilot recover from the dive?	Because the pilot failed to initiate a timely recovery.
Q3: Why was that?	Because he might have been unconscious (or oxygen deprived).
Q4: Why was that?	We don't know. We need to find out.
Etc.	

- 2018 Hawaii False Missile Alert (Wikipedia). Online: https://en.wikipedia.org/wiki/2018_Hawaii_false_missile_alert (Accessed Mar 2019)

Understanding why there is an error

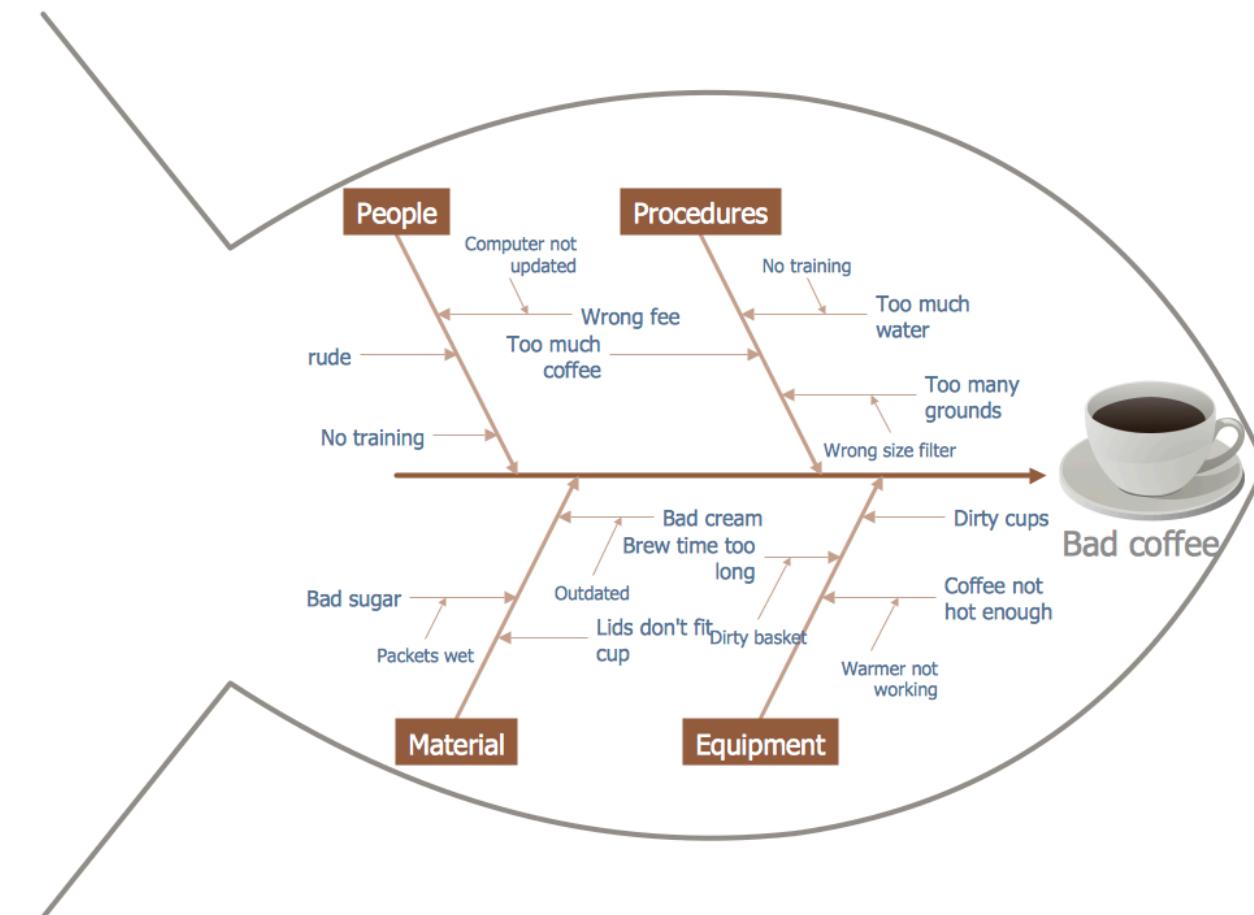
- Most common errors
- Blame & punish;
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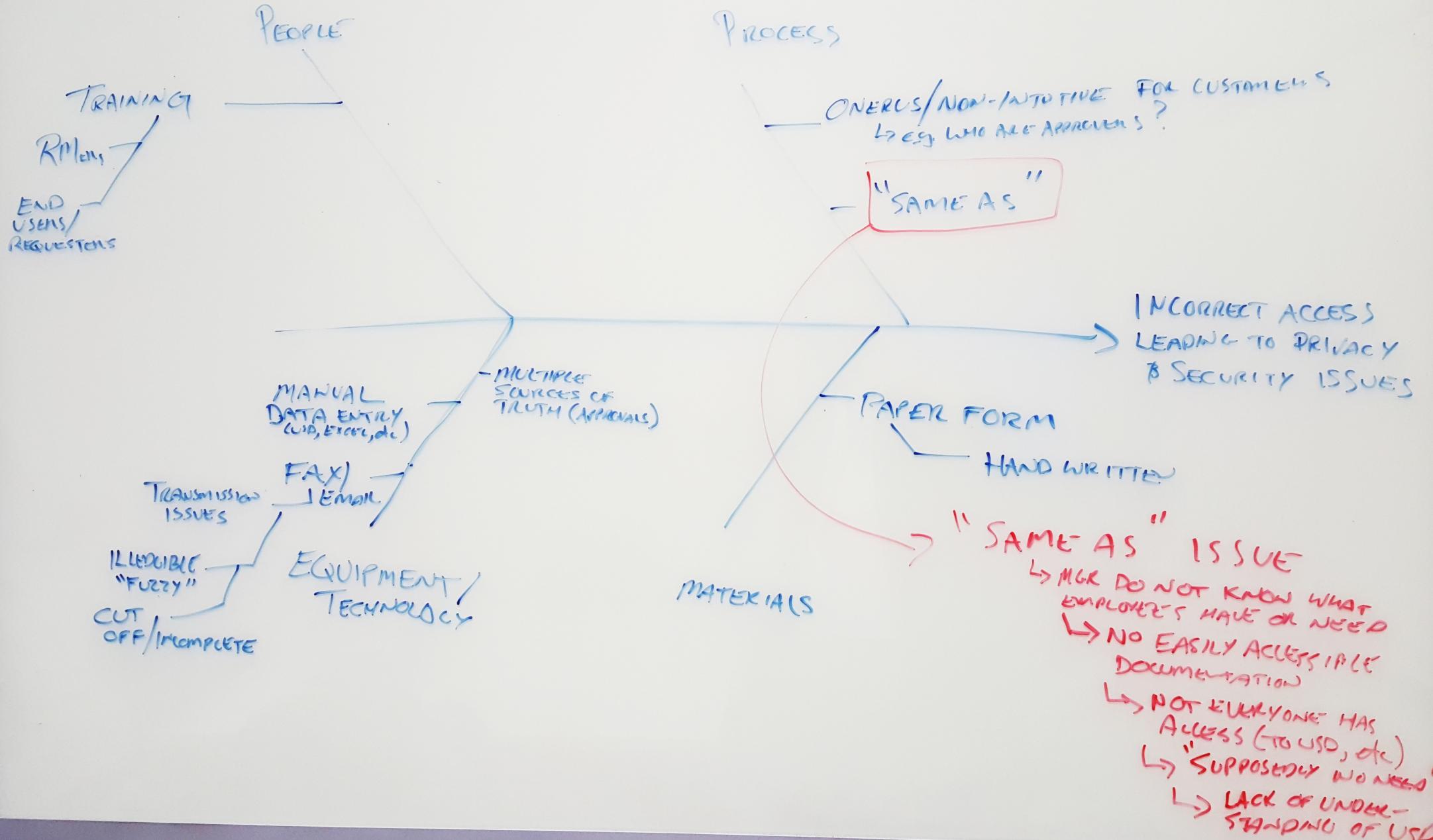
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Understanding why there is an error

- Most common errors
- Blame & punish;
blame & train
- Root cause analysis
- The 5 whys
- Culture needs shifting



- 2018 Hawaii False Missile Alert (Wikipedia). Online: https://en.wikipedia.org/wiki/2018_Hawaii_false_missile_alert (Accessed Mar 2019)

Deliberate violations

- D. Snowden. How to Organize a Children's Party (2009). Online: <https://youtu.be/MiwB92eZaJg> (Accessed Mar 2019)

Deliberate violations

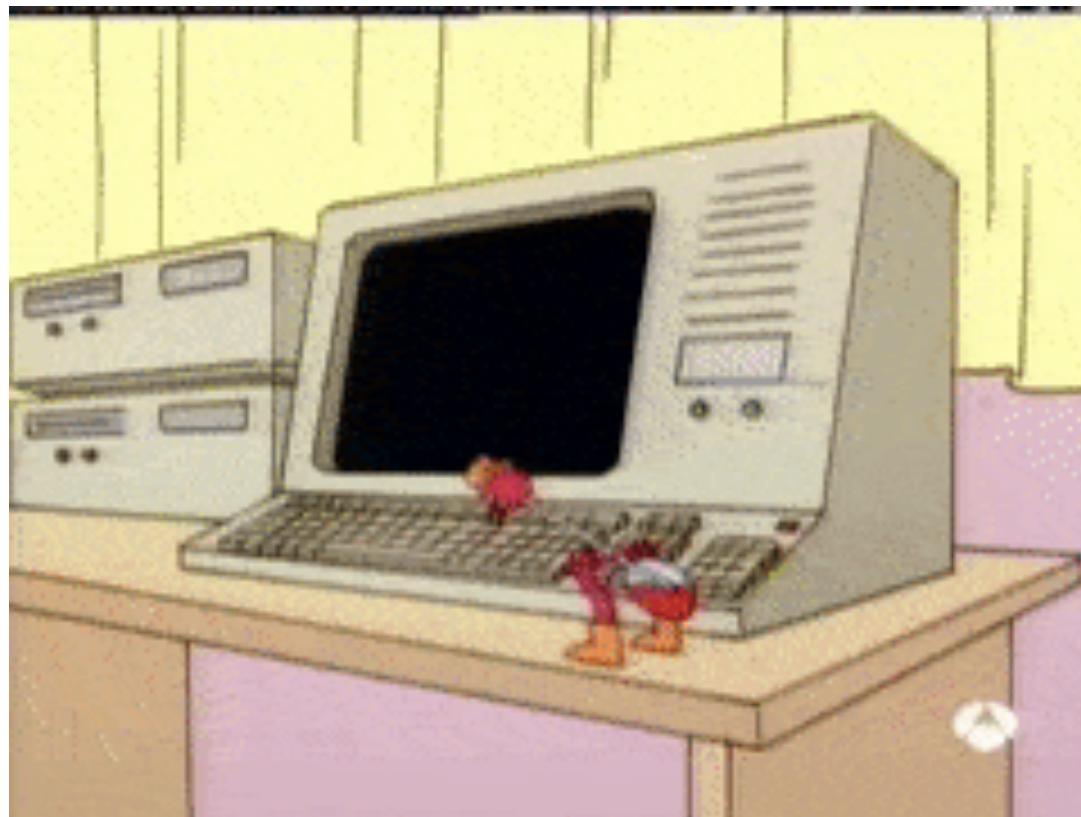
- We are risk takers



- D. Snowden. How to Organize a Children's Party (2009). Online: <https://youtu.be/Miwb92eZaJg> (Accessed Mar 2019)

Deliberate violations

- We are risk takers
- The routine/mundane



- D. Snowden. How to Organize a Children's Party (2009). Online: <https://youtu.be/Miwb92eZaJg> (Accessed Mar 2019)

Deliberate violations

- We are risk takers
- The routine/mundane
- Major cause of errors



- D. Snowden. How to Organize a Children's Party (2009). Online: <https://youtu.be/Miwb92eZaJg> (Accessed Mar 2019)

Deliberate violations

- We are risk takers
- The routine/mundane
- Major cause of errors
- D. Snowden, organizing a kids party



- D. Snowden. How to Organize a Children's Party (2009). Online: <https://youtu.be/Miwb92eZaJg> (Accessed Mar 2019)

Types of errors

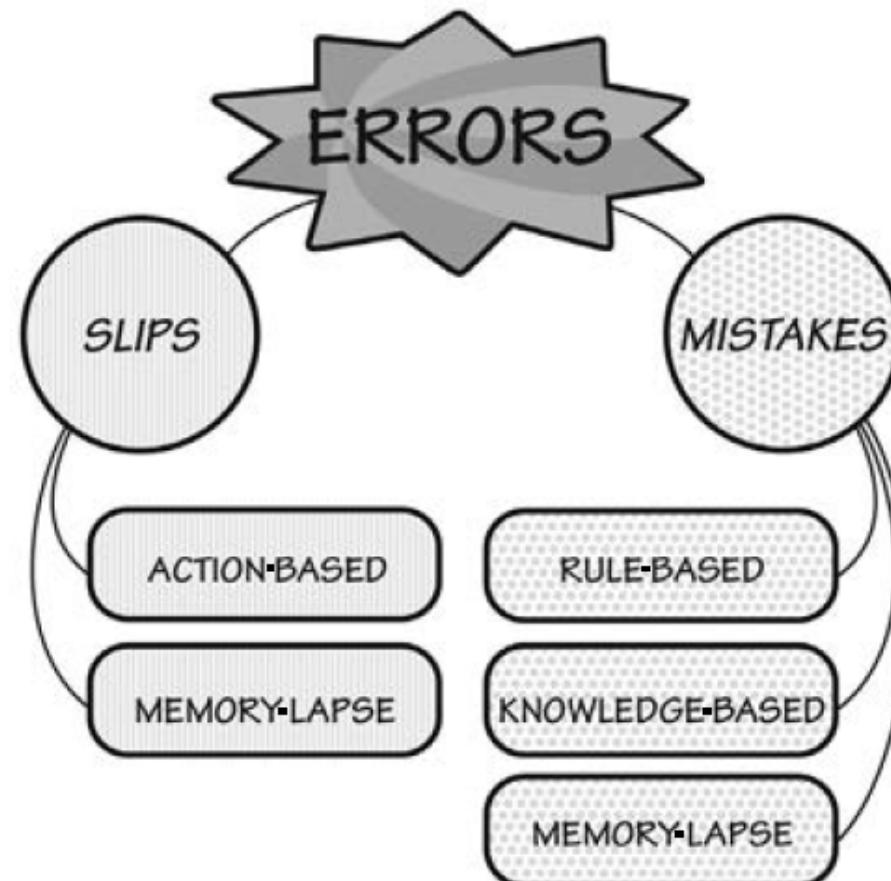
Types of errors

- Human error



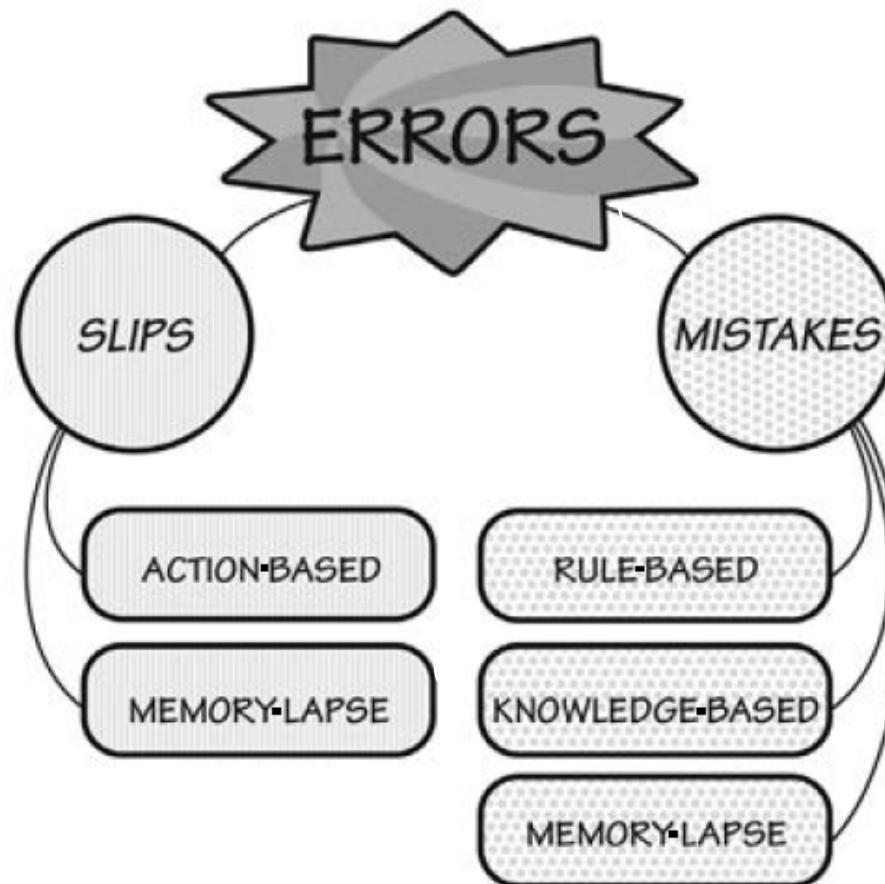
Types of errors

- Human error
- Slips
 - Action-based
 - Memory-lapse



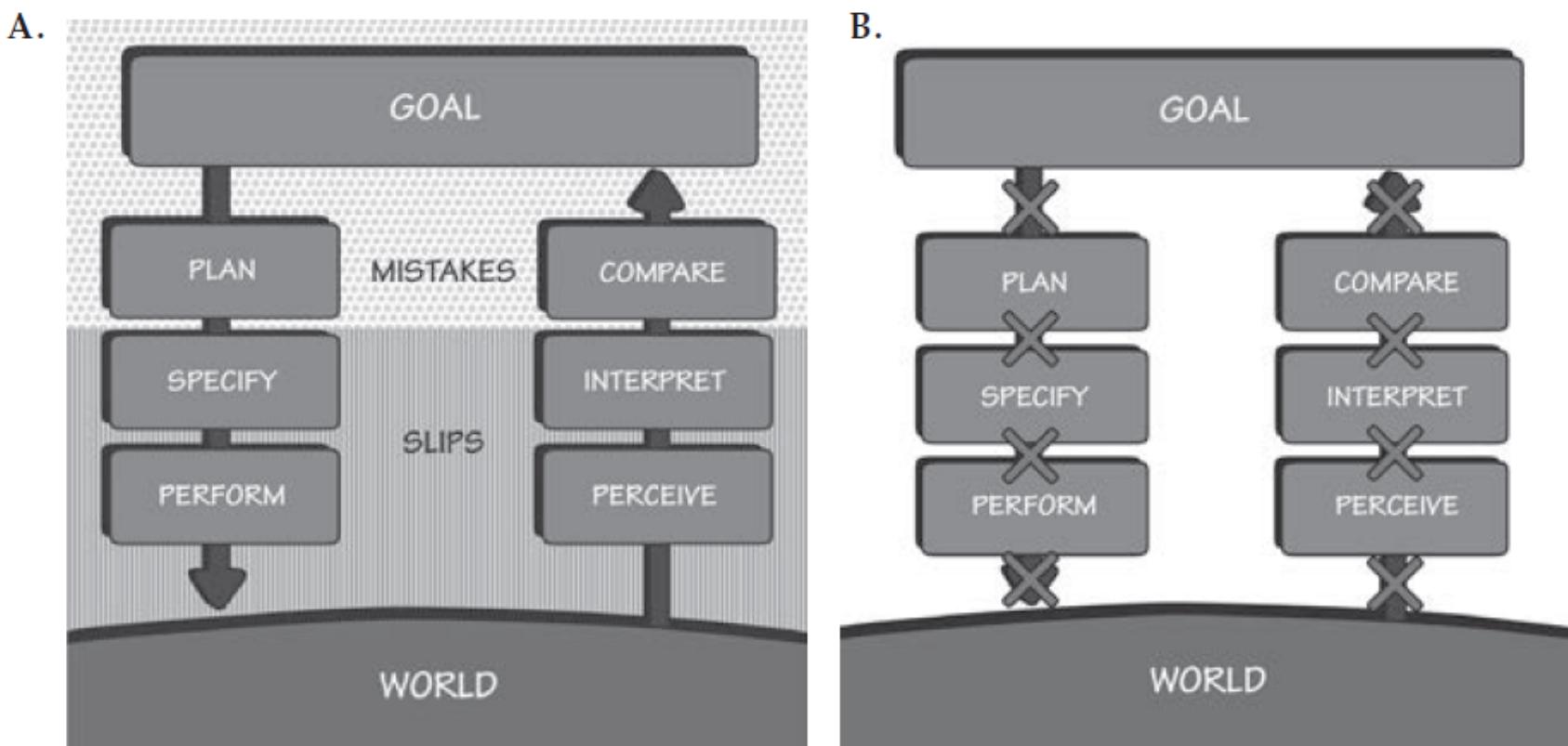
Types of errors

- Human error
- Slips
 - Action-based
 - Memory-lapse
- Mistakes
 - Rule-based
 - Knowledge-based
 - Memory-lapse



Types of errors

- Human error
- Slips
 - Action-based
 - Memory-lapse
- Mistakes
 - Rule-based
 - Knowledge-based
 - Memory-lapse
- Seven stages



Design advice for handling slips

Design advice for handling slips

- A story

Design advice for handling slips

- A story
- Capture slips



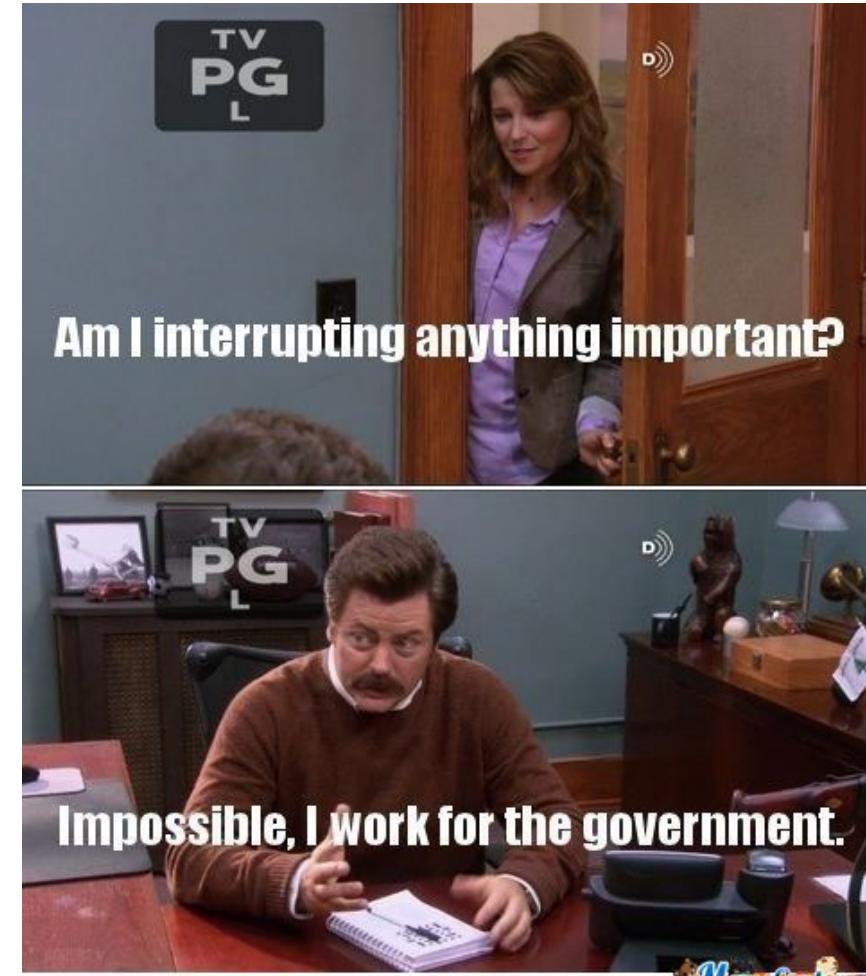
Design advice for handling slips

- A story
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- Description-similarity slips



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- Capture slips
- Description-similarity slips
- Memory-lapse slips



Design advice for handling slips

- A story
- Capture slips
- Description-similarity slips
- Memory-lapse slips
- Mode error slips



Design advice for handling mistakes

Design advice for handling mistakes

- Rule-based mistakes



Design advice for handling mistakes

- Rule-based mistakes
- Knowledge-based mistakes

Design advice for handling mistakes

- Rule-based mistakes
- Knowledge-based mistakes
- Memory-lapse mistakes



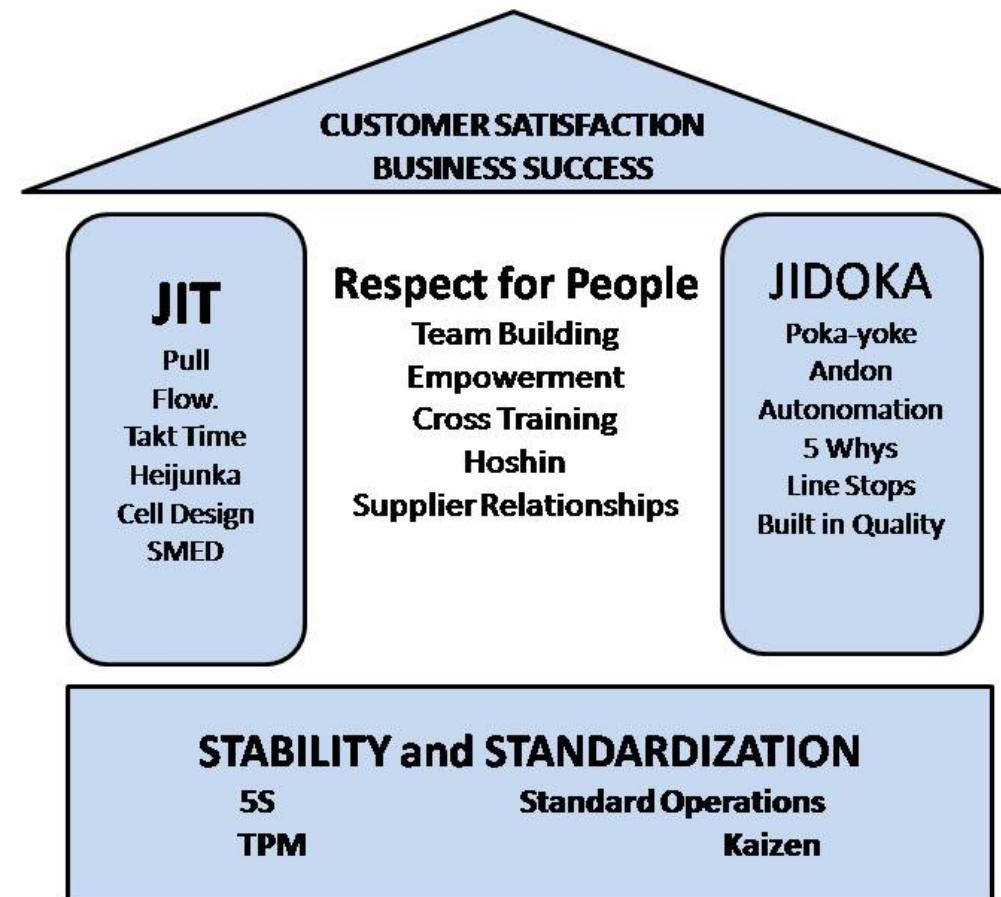
Detecting, reporting, & designing for error

Detecting, reporting, & designing for error

- Instilling a safety culture

Detecting, reporting, & designing for error

- Instilling a safety culture
- Toyoda production system/Lean
 - Jidoka
 - Poka-yoke



Detecting, reporting, & designing for error

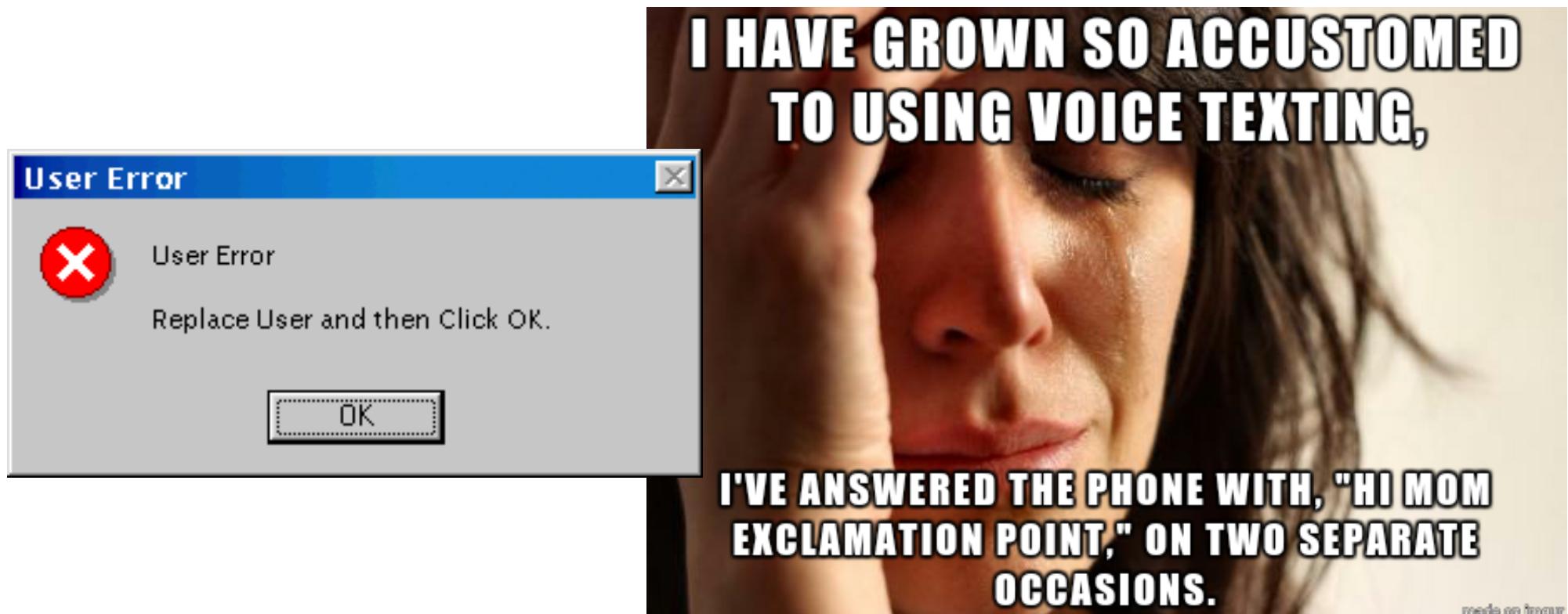
- Instilling a safety culture
- Toyoda production system/Lean
 - Jidoka
 - Poka-yoke
- Designing for error
 - Lessons learned
 - Sensibility checks
 - E.g. [Therac-25](#)



When good design isn't enough

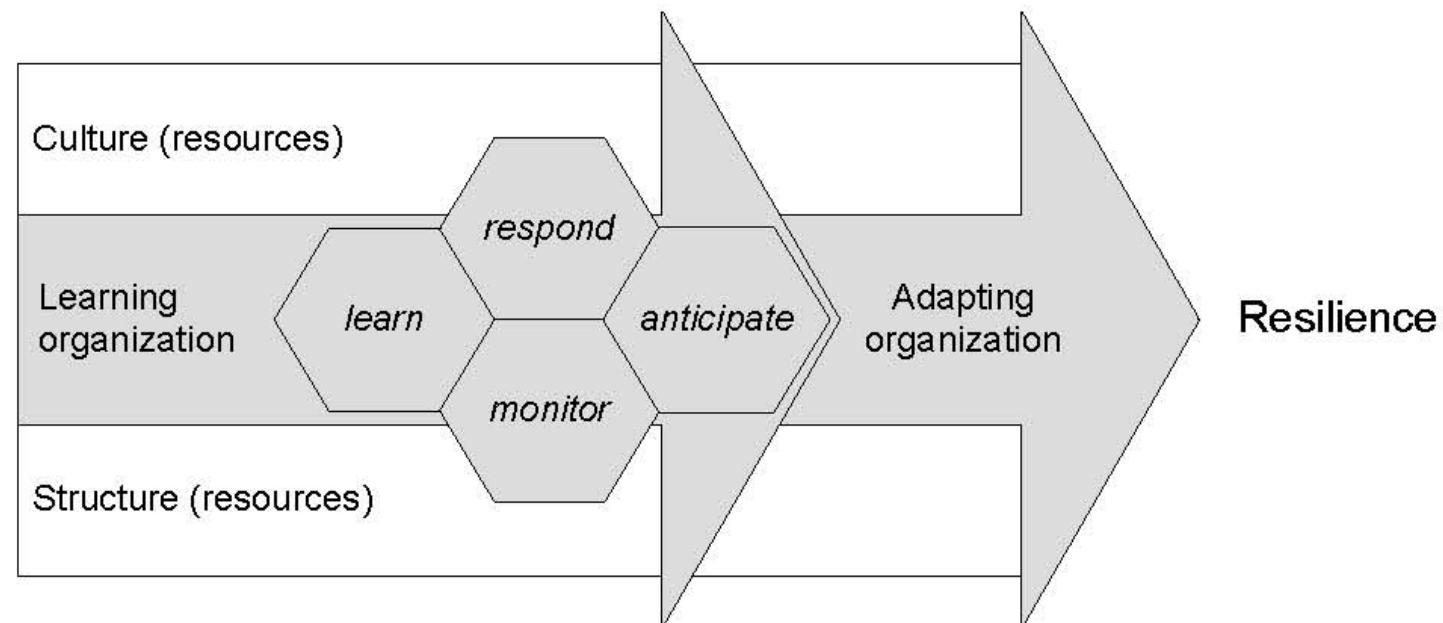
When good design isn't enough

- When people really are at fault



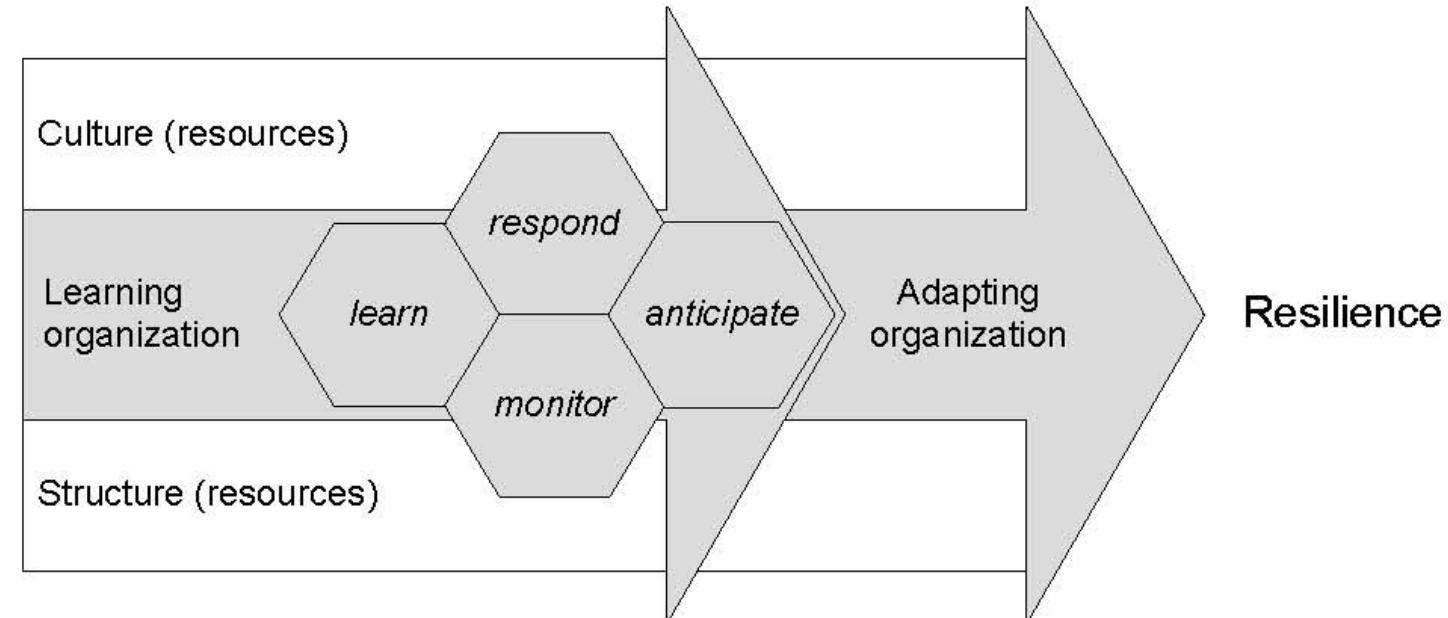
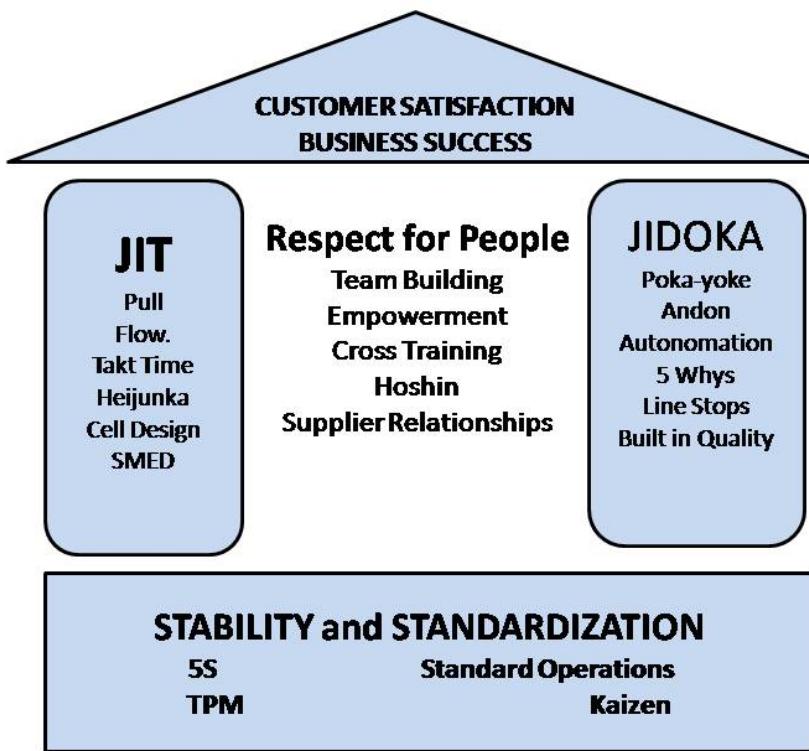
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- When people really are at fault
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When good design isn't enough

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The paradox of automation

- C. Morgan (Huffington Post). The Value of Community (2017). Online: https://www.huffingtonpost.com/dr-carol-morgan/the-value-of-community_ar_b_11109474.html (Accessed Mar 2019)

The paradox of automation

- Machines are getting “smarter”



- C. Morgan (Huffington Post). The Value of Community (2017). Online: https://www.huffingtonpost.com/dr-carol-morgan/the-value-of-community-ar_b_11109474.html (Accessed Mar 2019)

The paradox of automation

- Machines are getting “smarter”
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The paradox of automation

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- Automation and society
 - *“The most efficient and effective method of conveying information to and within a development team is face-to-face conversation”*

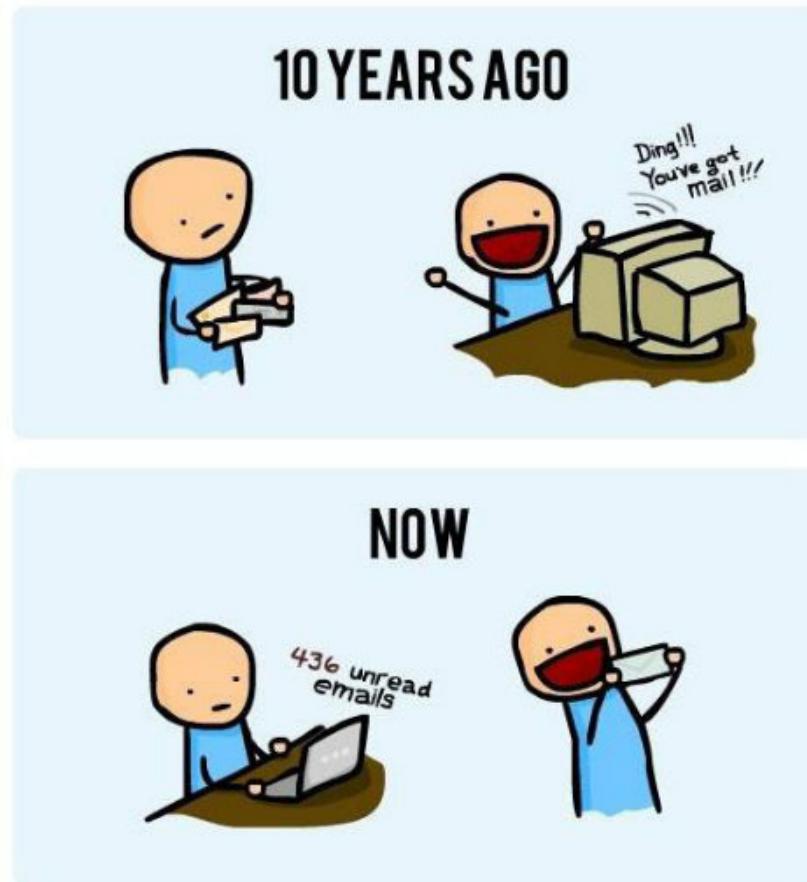


poofytoo.tumblr.com

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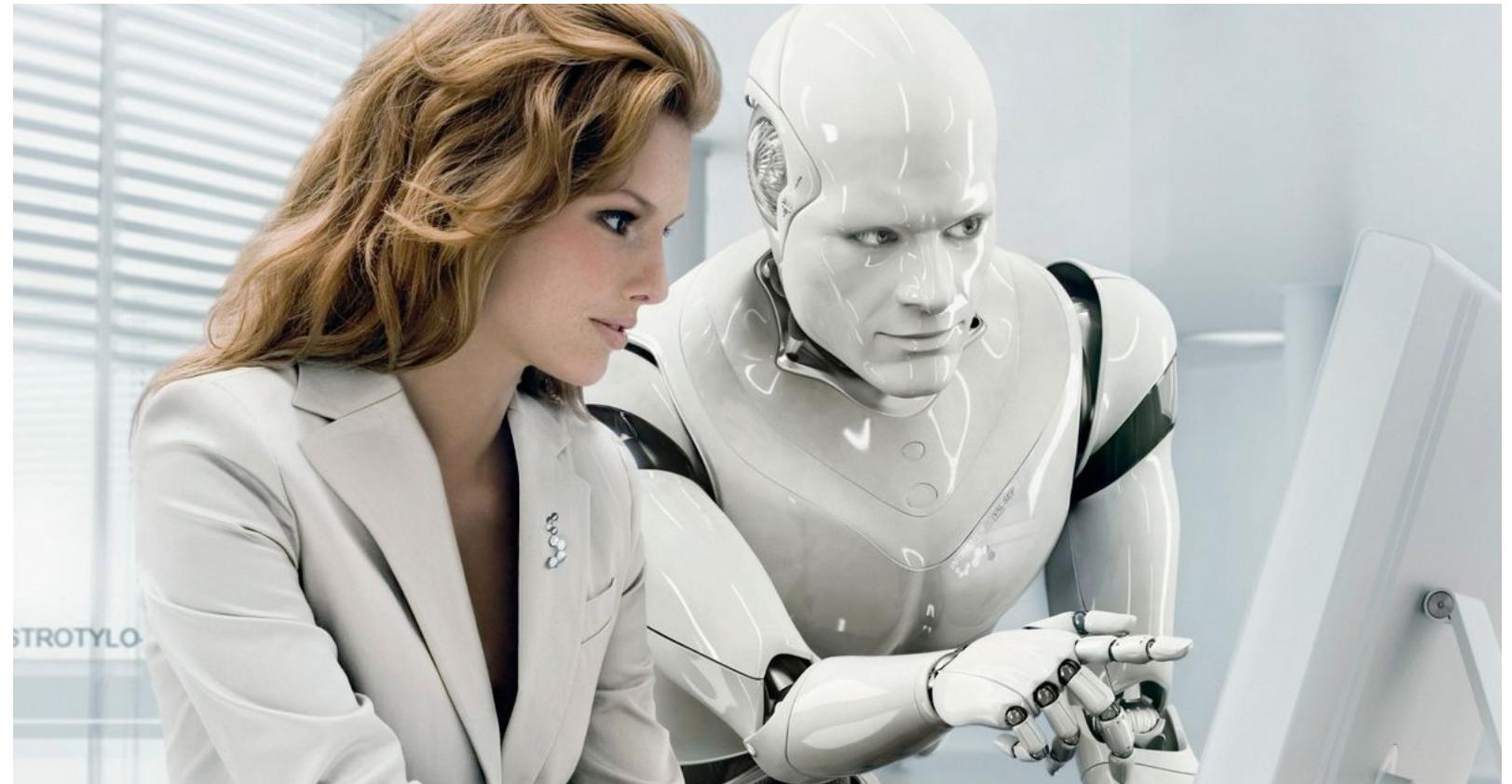
Design principles for dealing with error

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- People vs. machines

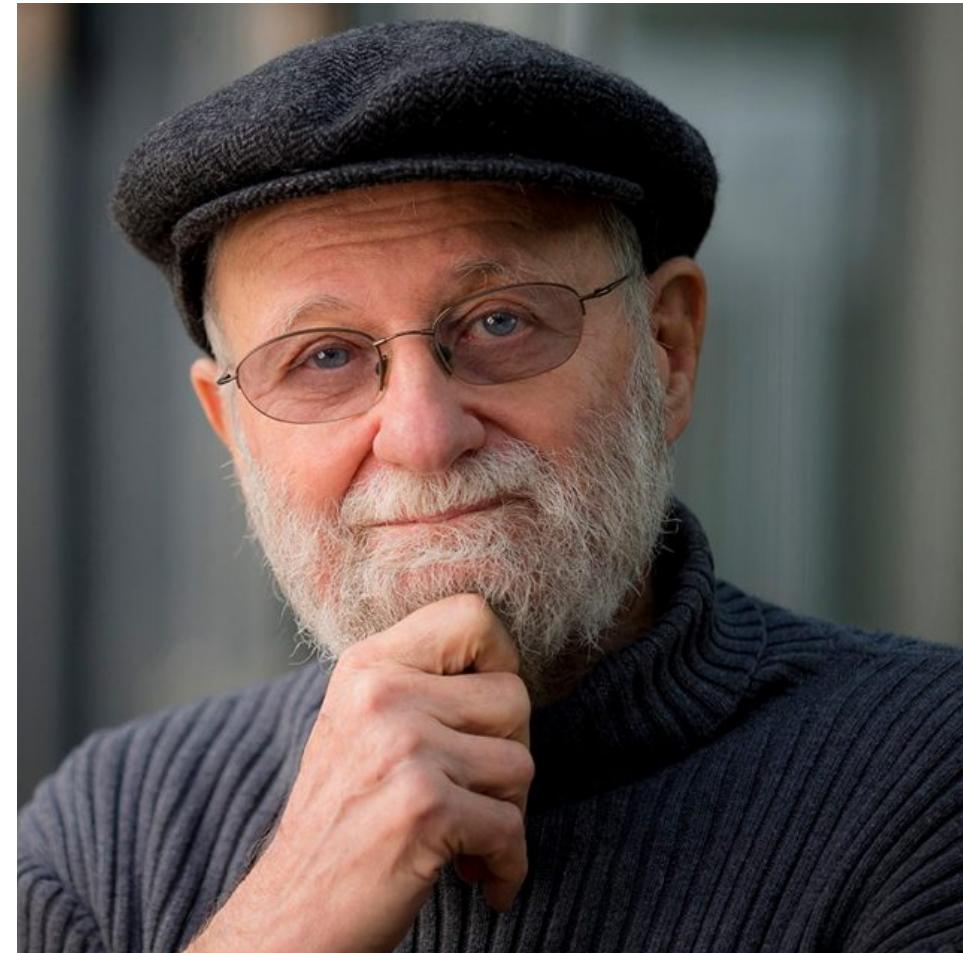
Design principles for dealing with error

- People vs. machines
- It's a collaboration!



Design principles for dealing with error

- People vs. machines
- It's a collaboration!
- Design principles



Questions/Discussions

- Accident stats
- Blame
- Root cause analysis
- Processes
- Slips
- Slips 2
- Mistakes
- Seven stages
- Resilience Engineering
- People and machines

Image refs

- Human error, https://blog.cloudhq.net/wp-content/uploads/2011/08/tumblr_lp8j7dshPG1qzlk80.gif
- Limits, <https://img-galleryroulette.stackpathdns.com/wp-content/uploads/2018/03/fourth-wall.jpg>
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- User error, <https://i.pinimg.com/originals/29/ba/a4/29baa48b23376dd59986b475debb5306.gif>
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...Image refs

- Homer Y, <https://thumbs.gfycat.com/SleepyQueasyAssassinbug-max-1mb.gif>
- Moar user error, <https://i.imgur.com/fNpeysm.png>
- Juicy cereal, <http://del.h-cdn.co/assets/15/40/768x575/gallery-1443460862-delish-orange-juice-cereal.jpg>
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