

# “Murphy, Murphy, Murphy...”

## IT, risks and ergonomics

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# Once upon a time...

- ... in the first year of IT College, there was a course titled “Risk and Safety Management” ...
- ... that drove the students nuts
- So they started to yell and throw things at the prof (well, not really – but they were profoundly pissed)
- So the course got replaced with this one here
- In 2008, another prof (who had been a student back then) held the anniversary speech - and said something like “Howdy guys – remember how we had to measure *the height of the damn stool?*”

# Emmm...



- The course dealt with important issues – but failed to convey the importance in the IT context
- When a plane hits a skyscraper, it is a disaster. When a server goes down, it is “some IT geek problem”...
- ... but what if the server went down and CAUSED the plane to hit that building...?
- IT risks form a wide circle of issues, only a part of them are purely technological. And even “the height of that damn stool” may well play a role

# Core problems of today

- Technology evolves at a great speed (e.g. Bugatti Chiron)
- Problem 1: The humans are not much wiser than before (Ex: a 2022 Bugatti Mistral + a 0.5l whisky + a concrete wall)
- Problem 2: Ubiquity breeds dependency and vulnerability (e.g. 9/11)
- Problem 3: Let's quote a classic again...

# Wanted the best, came out as usual

- "A flying saucer creature named Zog arrived on Earth to explain how wars could be prevented and how cancer could be cured. He brought the information from Margo, a planet where the natives conversed by means of farts and tap dancing.

Zog landed at night in Connecticut. He had no sooner touched down than he saw a house on fire. He rushed into the house, farting and tap dancing, warning the people about the terrible danger they were in. The head of the house brained Zog with a golfclub."

- *Breakfast of Champions* by Kurt Vonnegut

# The art of risk reduction

- Never at zero (says Mr Murphy)
- Risk management – historically a mix of environmental issues and workplace safety
- In IT: tech + human factors (human factors engineering)!
- Ergonomics: Greek ἔργον, "work", plus νόμος, "natural law"
- Much in common, some specific features

# An important factor

- Time – or lack of it
- Learning is a major reducer of risks, but it takes time
- Haste is a major risk factor (in almost every field)
- Is also an enemy of learning!
- More Greek: σχολή (skolē) <= school (source of learning!)
  - original meanings “leisure” and “pastime” (something done in leisure time)
  - essentially, having control over one’s time
  - difference between free people from slaves

# IT risks

- everything about electronic/online elections - the infamous Diebold machine in the US, the first years of Estonian e-elections having been "Microsoft exclusive" (the software only worked on IE) etc
- the world of social engineering and online scams
- exposure of directly dangerous information (bomb-building instructions, torture/murder techniques etc)
- malware
- cyberwar and terror in its many forms
- ...



# Comfort is the key

- Ergonomic furniture is comfortable (functional, durable and aesthetically pleasing)
- So are ergonomic clothes (fit the person well, use quality materials)...
- ... and ergonomic IT (easy to learn, well-documented, unambiguous)
- NB! This is often just what is needed to reduce risks!

# Human-machine system

- Which ones can be counted as one?
  - A cyborg
  - An Internet addict, 24/7 online
  - Auntie Tilly, uses a PC ½ hours a day, needs help with changing a DVD
- Correct answer: all three
- Risks are different, yet exist in all cases!

# “Stop, the light went red!”

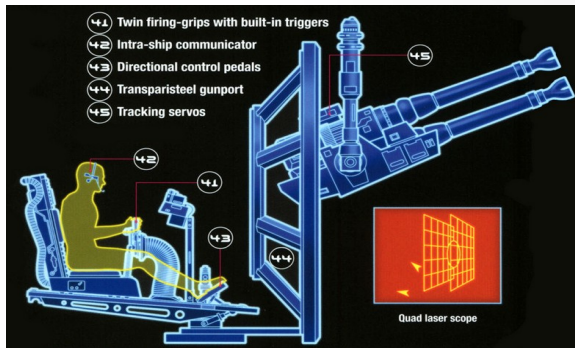
- Most information is usually acquired visually
- Striving to universality: pictograms
- Conditions:
  - Optimal space
  - Optimal lighting
  - Optimal size
  - Intuitiveness and understandability

# The same things in IT

- Customizing the visual output and/or maximizing the audience
  - Space <- distance from display
  - Lighting <- outer and inner, effects
  - Size <- display size, resolution, fonts
  - Intuitiveness <- focus on main elements, unambiguity of metaphors

# Control

- Machine -> human: (typically) visuals
- Human -> machine: switches or pointers
- Man in the Machine



Source:

[http://starwars.wikia.com/wiki/AG-2G\\_quad\\_laser\\_cannon](http://starwars.wikia.com/wiki/AG-2G_quad_laser_cannon)

- But also: mouse, spacebar, power switch

# In IT...

- Work environment (including lighting and furniture)
- Choice of peripherals (mouse vs trackball vs joystick)
- Clear alternatives: on/off, Enter/Esc/Space
- Location
- Colour
- Shape
- ...

# Three important concepts

- **Availability** - the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use (essentially – if the stuff keeps working or not!)
- **Usability** - the ease of use and learnability of the object; making it accessible to a wide circle of users (including elderly or disabled people, children etc)
- **Standards compliance** - allows use of objects of the same class interchangeably, making them easy to replace and promoting better usability (if the user can use one, he/she can likely use objects in compliance with the same standard)

# Talking to a machine

- Goal-oriented
- I/O suitable for the task
- Non-linear
- Commenting
- I/O chosen by human
- Suitable for user
- Robust
- Polite
- Instructive
- Using suitable language



# Two points

- Recalling the Internet communication topic:  
Communication = participants + information channel
- People with special needs (incl disabilities) are a good indicator of usability (or lack thereof) – as a rule of thumb, accessibility implies overall good usability

# “Alarm, alarm!”

- Risk = potential hazard
- Sometimes becomes real
- More than often, the results depend on reaction
- Two sample messages:
  - "Alarm!!!! You computer has a virus!!! Switch off the machine AT ONCE or you will lose EVERYTHING!"
  - "Attention! The CIH-4092 virus has been discovered in your computer. It can attack the file system and make a part of the disk unreadable. Try to run F-Prot or Eset, be sure to inform the tech department at 555-2424."
- Which one would you prefer?

# Some more things

- Clearly identifiable and distinguishable (not easily mistaken and preferably hard to produce without authorization)
- Addressing different senses (most commonly visual + sound)
- Sometimes, used selectively
  - “Mr Skylight to number one and two”

# Conclusion

- Technology evolves fast, humans do not -> most risks are human-related (also in IT!)
- The impact of IT risks on society is growing -> reduction skills become more vital
- Ergonomics -> usability -> risk reduction (-> security!)
- The border between tech and social stuff is hazy – social skills will be demanded more (also from IT staff)
- Training will be a main focus

**Thanks**