



Budapest, 26-28 October 2016

Hosted by:  ERICSSON

NOKIA

In partnership with:  H.T.B.
Human Factors Training Bureau

90 Minute Tutorial

UCAAT October 2016

Human Factors for Test Automation

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Contents

Introduction.....	3
Agenda.....	3
Objectives	3
Abstract	3
Isabel's biography	3
Some human factors.....	4
Slide 4: territory	4
Slide 5: Kübler-Ross.....	5
Slide 6 & 7: adopter curve.....	6
Slide 9: Exercise	8
Slide 10: Influence diagrams	9
Slide 14: Exercise	11
Lessons from industrialisation	14
Slide 25: Exercise	18
More People- Models for teamwork	19
Slide 27: heroes and demons	19
Slide 28: safety bias.....	20
Slide 30: Teamwork – Drexler-Sibbert	22
Slides: Other points.....	24
Slide 34: Exercise	26
Slide 35: Action plan	27

Introduction

Agenda

- (Some) human factors
 - Exercises
- Lessons from Industrialisation
 - Exercises
- People and teams
 - Exercises

Objectives

- 1. Understand that automation / industrialization involves human factors;**
- 2. Remember that other disciplines and industries have lessons for us;**
- 3. Be introduced to models to help us understand how to work with people.**

Abstract

Although this conference is about automation, people are at the heart of what is to be achieved by that push to industrialisation and tooling. People in teams are making the change from manual to automated testing and therefore factors of attitude to change, teamwork, motivation and communication are going to be very important. If automation projects are to succeed, we also need to consider human factors required for success.

When people's jobs are industrialised, their reaction is often fear, disbelief and denial. Evidence from the history of the industrial revolutions – whether mechanical or information industrialisation – tells us that the very idea that activities requiring craftsmanship, cognitive skills, inventiveness, intelligence and other human traits can be done robotically or broken down into industrial steps is anathema to the people whose roles are affected. We can all see why other people's roles can be automated... but we protect our own roles and humanity. At the same time, once roles have been automated and industrialised, the humans still required to operate the automation, or even override it if it malfunctions, may become over-reliant and over-trusting of the automation and not notice when it goes wrong. Evidence from usability and user experience studies, as well as air crashes caused by pilot over-trust of the automatic pilot tell us that the automation and industrialisation includes encouraging people to continue to think.

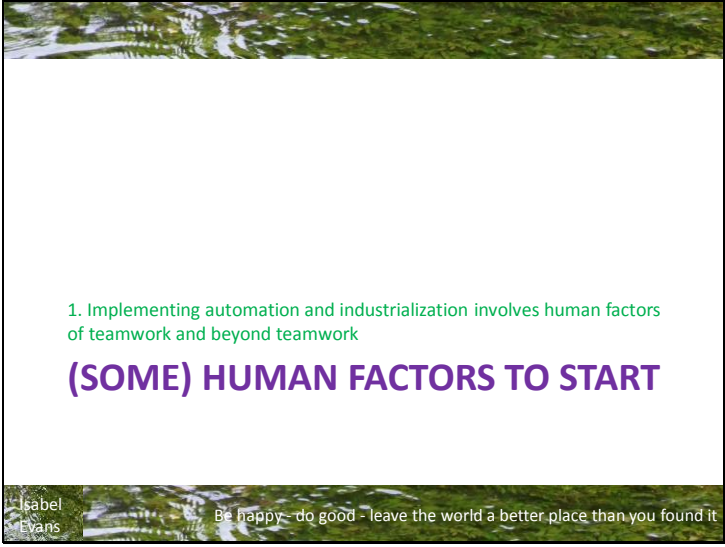
Delegates will be provided with an opportunity to identify and discuss problems and potential solutions to human factor problems around implementation of industrialised automation, and a number of practical ways to address teamwork and human problems in projects. The methods presented are applicable to people in all forms of endeavour where change and specifically a move to automation/industrialisation is intended.

Isabel's biography

Independent quality and testing consultant Isabel Evans has more than thirty years of IT experience in quality management and testing in the financial, communications, and software sectors. Her quality management work focuses on encouraging IT teams and customers to work together via flexible processes designed and tailored by the teams that use them. Isabel authored *Achieving Software Quality Through Teamwork* and chapters in *Agile Testing: How to Succeed in an eXtreme Testing Environment*; *The Testing Practitioner*; and *Foundations of Software Testing*. A popular speaker at software conferences worldwide, Isabel is a Chartered IT Professional and Fellow of the British Computer Society, and has been a member of software industry improvement working groups. Her latest research and practice is in User Experience Design and Testing, and the application of that to test automation tools

Some human factors

Slide 3

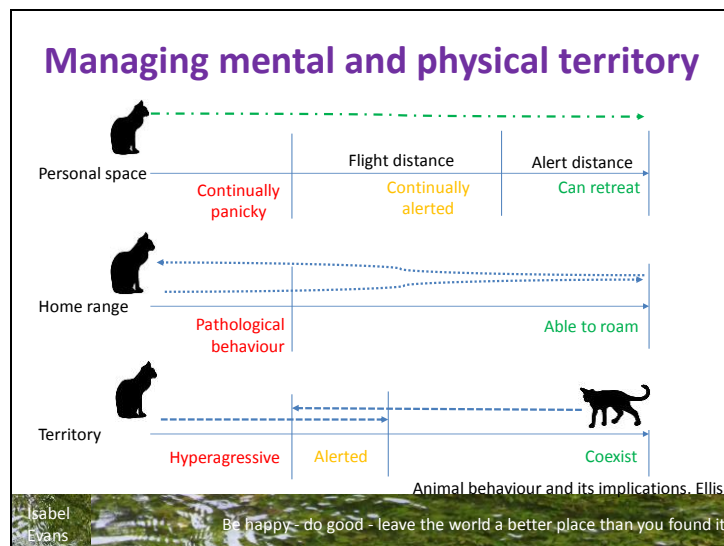


1. Implementing automation and industrialization involves human factors of teamwork and beyond teamwork

(SOME) HUMAN FACTORS TO START

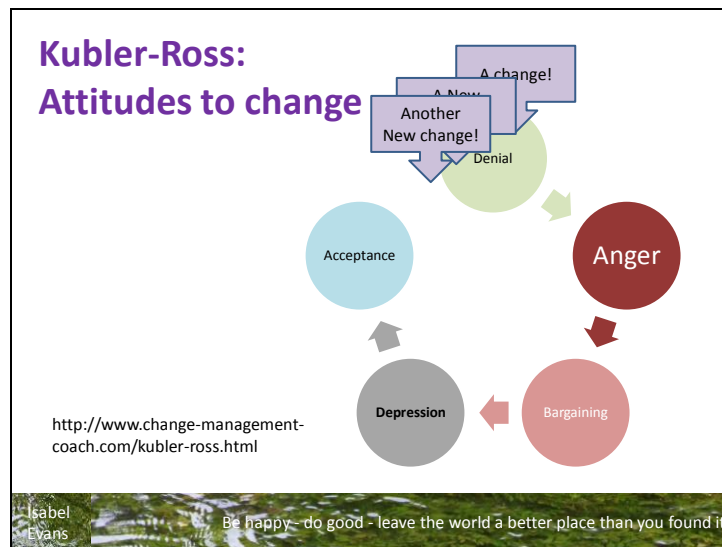
Isabel Evans Be happy - do good - leave the world a better place than you found it

Slide 4: territory



People are at the heart of it all! The Conference is about automation but People are at the heart of what is to be achieved: People in teams, People making changes. Different people have different attitudes to change, and to teamwork. We are animals! We have Territory (Mental and physical).

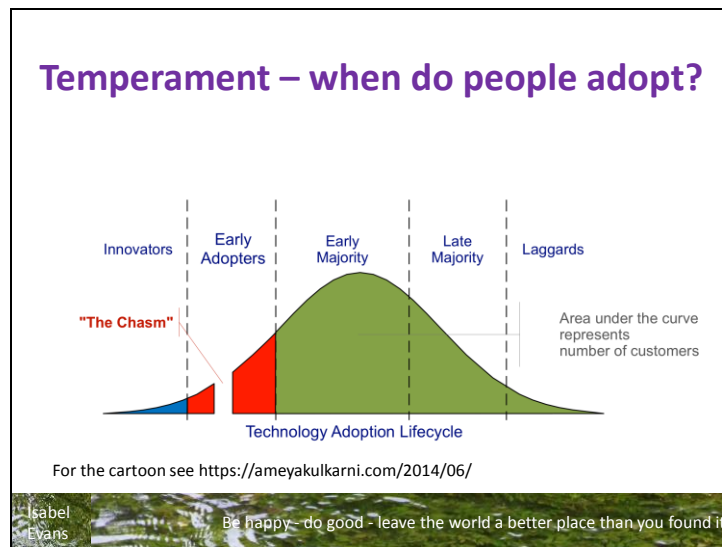
Slide 5: Kübler-Ross



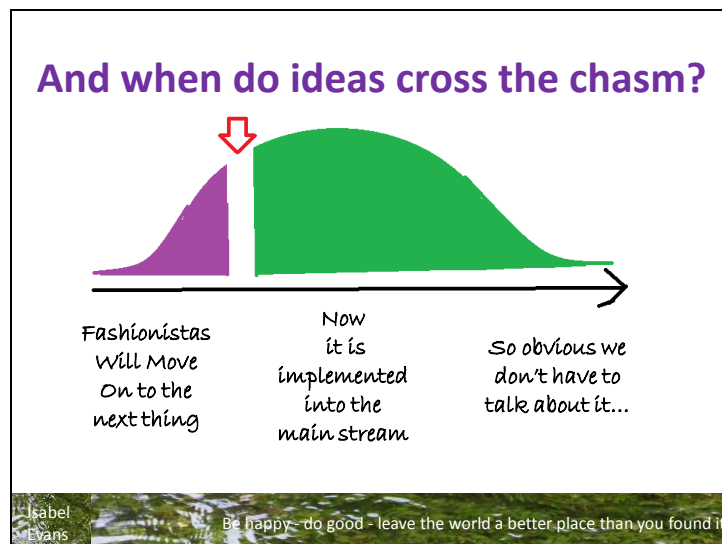
<http://www.change-management-coach.com/kubler-ross.html>

- Denial
- Anger
- Bargaining
- Depression
- Acceptance

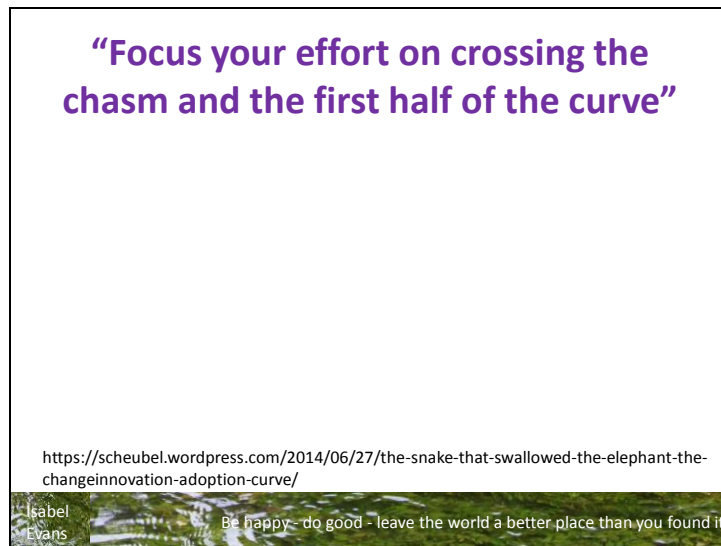
Slide 6 & 7: adopter curve



Slide 7



Slide 8




Remember the Little Prince and the Snake eating the elephant.

Slide 9: Exercise

Have a go...
think
pair
share

5 mins

- Influences on automation
 - Why automate?
 - Reasons to automate
 - Reasons NOT to automate
 - How to automate
 - Enablers to automation
 - Blockers to automation



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Influences on automation

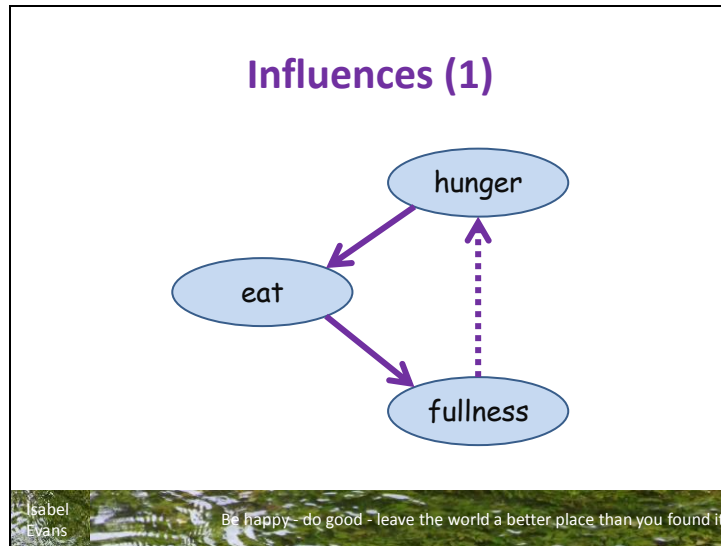
Why automate?

Reasons to automate	Reasons NOT to automate

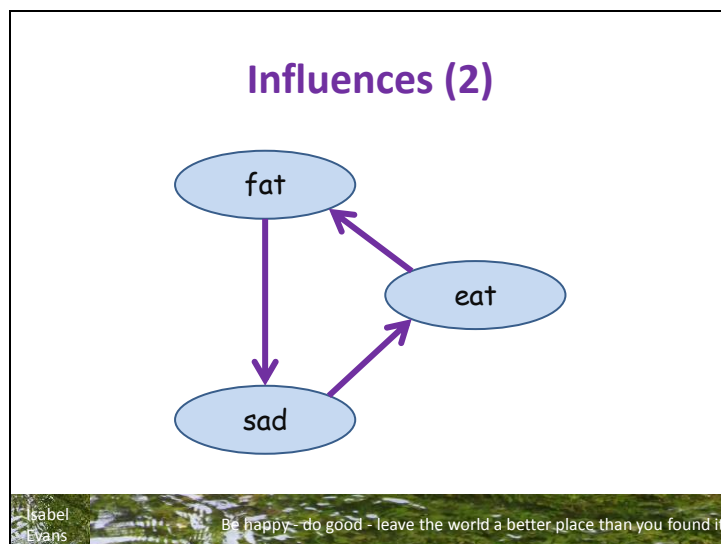
How to automate

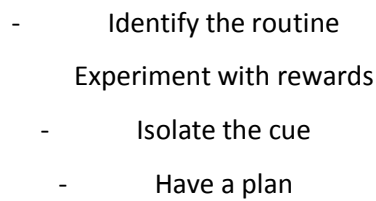
Enablers to automation	Blockers to automation

Slide 10: Influence diagrams



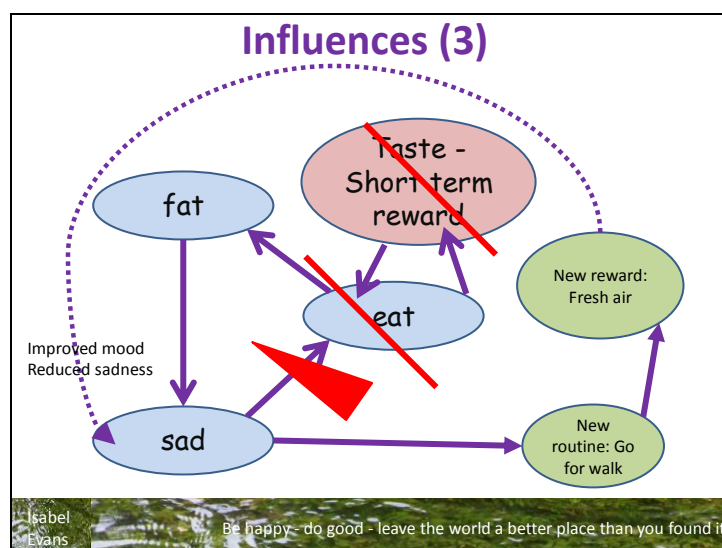
Slide 11





Trickster Makes This World by Lewis Hyde

Slide 13: changing the habit by changing the short term reward

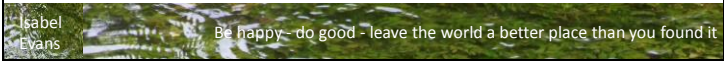


Slide 14: Exercise

**Have a go...
think
pair
share**

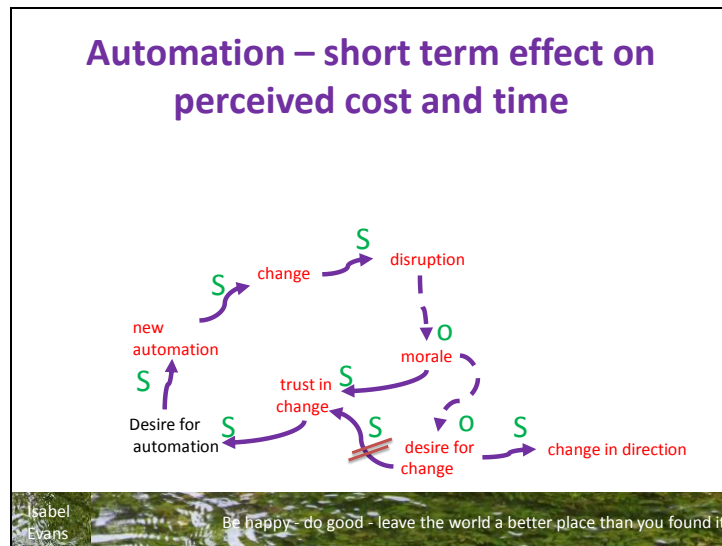
15 mins

- Influences on automation
 - One reason (for managers) to automate... is to reduce cost and time?
 - What happens to cost and time when you automate?
 - Discuss what happens to cost and time when you introduce automation
 - Draw a diagram to show what happens to cost and time when you introduce automation

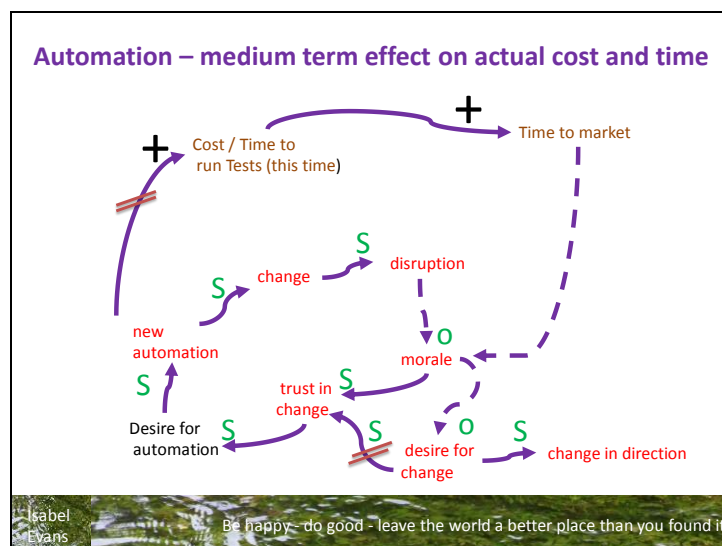


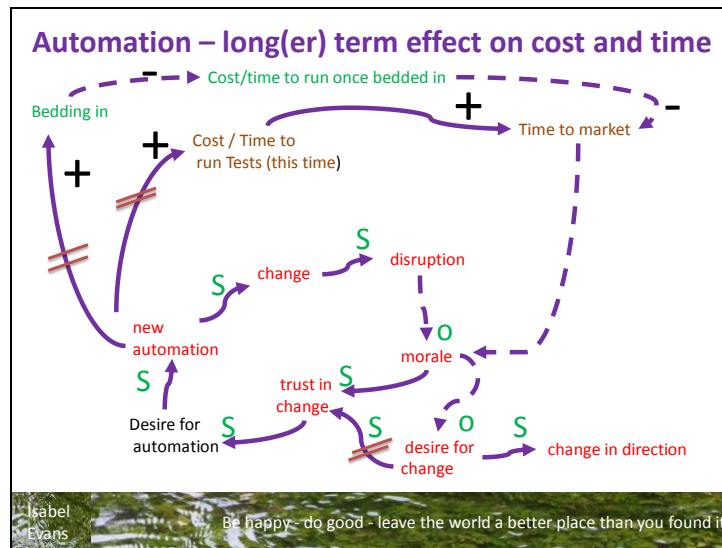
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Slide 15



Slide 16

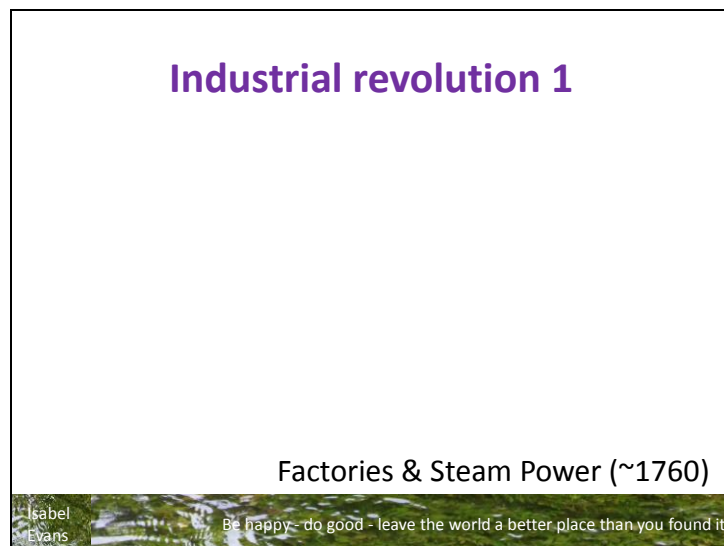




Lessons from industrialisation



Slide 19



Opposed by: Luddite Rebellion 1811 - 1813

Textile workers with Grievances

- Wage cutting
- Use of un-apprenticed youths
- “wide frames” which produced
- Cheap inferior quality goods... Destroying the reputation of their trade.
- <http://www.luddites200.org.uk/theLuddites.html>



Opposed by e.g. Tolpuddle Martyrs 1832

https://en.wikipedia.org/wiki/Tolpuddle_Martyrs

https://en.wikipedia.org/wiki/Trade_union

*God is our guide! from field, from wave,
From plough, from anvil, and from loom;
We come, our country's rights to save,
And speak a tyrant faction's doom:
We raise the watch-word liberty;
We will, we will, we will be free!*

Opposed by: e.g. Sheffield Outrages 1860's

Early success in steel production

Long working hours

Desperately unpleasant conditions

Little or no safety

Grinder's Asthma:

They usually begin their work in the fourteenth year, and if they have good constitutions, rarely notice any symptoms before the twentieth year...

https://en.wikipedia.org/wiki/Sheffield_Outrages

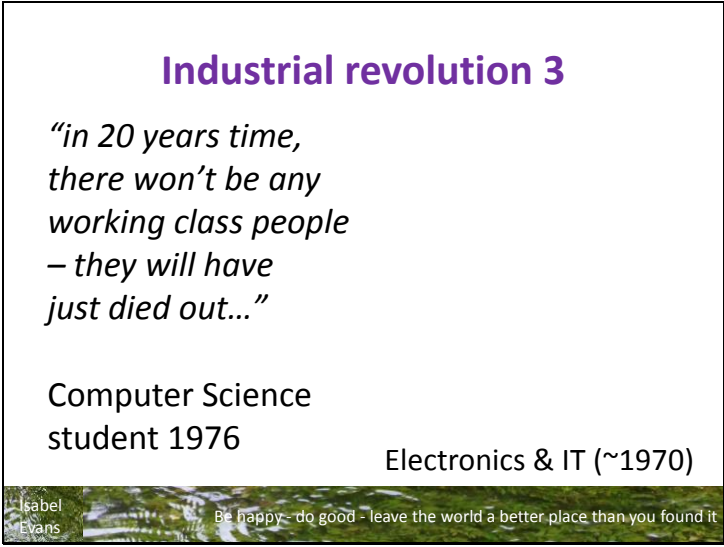
Slide 21

Industrial revolution 3

*“in 20 years time,
there won’t be any
working class people
– they will have
just died out...”*

Computer Science
student 1976

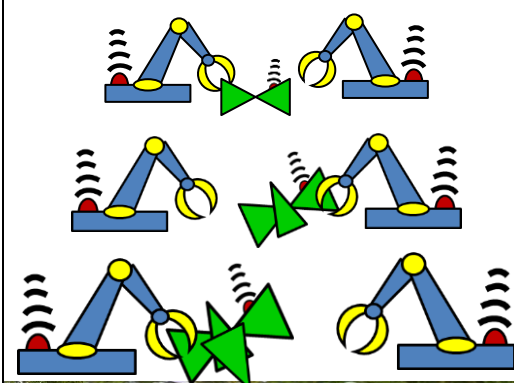
Electronics & IT (~1970)



“The Collapse of Work” Sherman and Jenkins 1979
... a career on the stage
or in the arts...

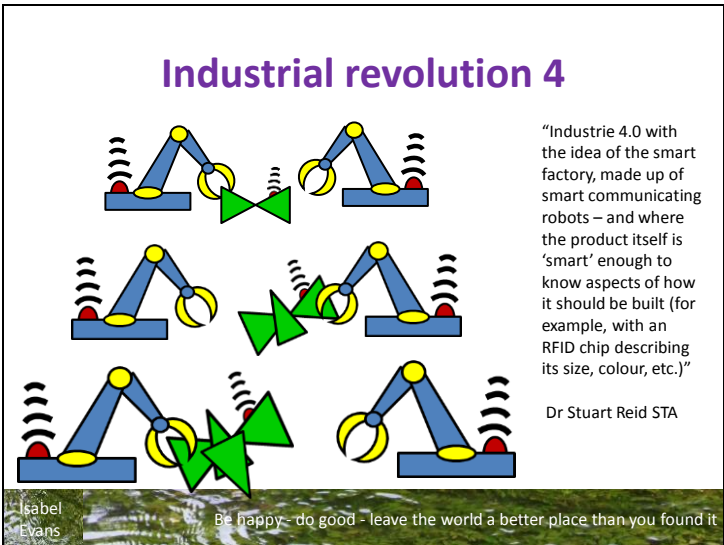
Slide 22

Industrial revolution 4



“Industrie 4.0 with the idea of the smart factory, made up of smart communicating robots – and where the product itself is ‘smart’ enough to know aspects of how it should be built (for example, with an RFID chip describing its size, colour, etc.)”

Dr Stuart Reid STA




Slide 23

And whose job is affected now?

http://crest.cs.ucl.ac.uk/cow/47/slides/cow47_White.pdf (Borrowed from David White, CREST, UCL)

"looks forward to a world in which our successors regard human programmers as a quaint anachronism of the past in the same way that we now regard the human computers of our nineteenth and twentieth century forbearers..."
Langdon et al. Optimising Existing Software with Genetic Programming. TEVC 2012.



Computer Programming To Be Officially Renamed "Googling Stackoverflow"

103k SHARES

Washington DC - The IEEE have produced a report today where they strongly recommend that from now on, the discipline of Computer Programming should be officially renamed to "Googling Stackoverflow".

"We are recommending a root-and-branch name change to this discipline", said President of the IEEE, Thomas M. Conte. "We are even going to change the official name of the IEEE Computer Society to the IEEE Quick Look At StackOverflow Society".

"We are furthermore recommending that all universities across the planet should cease to award Bachelor's degrees, Masters or PhDs in computer programming or software engineering and instead they should award these degrees in Googling Stackoverflow."

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<http://www.theallium.com/engineering/computer-programming-to-be-officially-renamed-googling-stackoverflow/>

http://crest.cs.ucl.ac.uk/cow/47/slides/cow47_White.pdf

Slide 24

People fear automation

- We value...
 - Craftsmanship
 - Cognitive skills
 - Inventiveness & intelligence
 - and other human traits
- We resent and fear
 - Robotics
 - Industrial steps
 - When they affect our speciality.

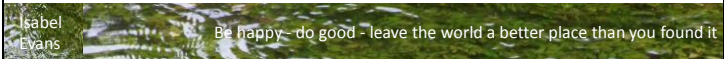
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Slide 25: Exercise

**Have a go...
think
pair
share**

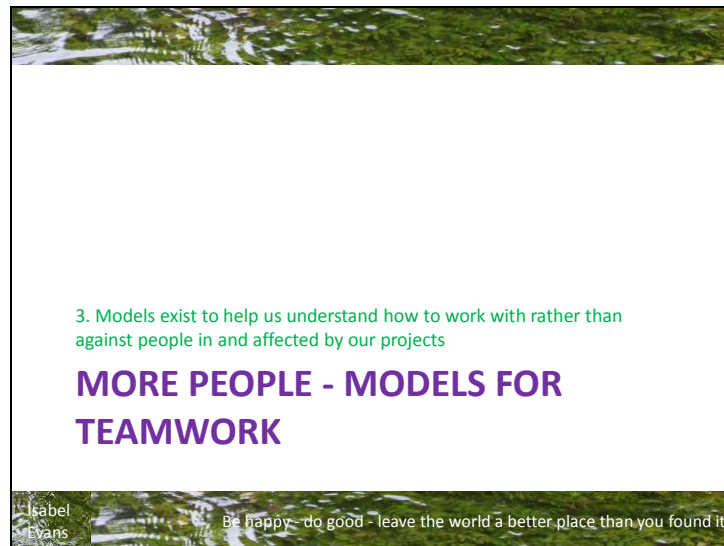
10 mins

- What fears might people have about automation?
 - Choose 2 or 3 roles in an IT project
 - For each role discuss and list
 - What affect will automation actually have for them?
 - What might they perceive as the affect of automation?

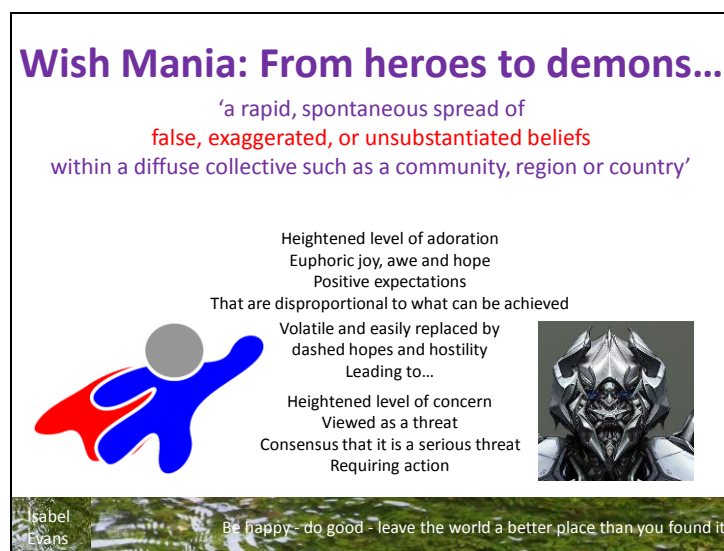


- What fears might people have about automation?
- Choose 2 or 3 roles in an IT project
- For each role discuss and list
- What affect will automation actually have for them?
- What might they perceive as the effect of automation?

More People- Models for teamwork



Slide 27: heroes and demons



“the demands, incentives and pressures of democratic politics creates and sustains a boom-and-bust cycle of heroic expectations and dashed hopes”

Moral Panic Studies Working Paper Series* From Folk Devils to Folk Heroes: Rethinking the Theory of Moral Panics Matthew Wood and Matthew Flinders University of Sheffield, UK

https://www.brunel.ac.uk/data/assets/pdf_file/0009/255339/20122FromFolkDevilstoFolkHeroesWoodandFlinders.pdf

Slide 28: safety bias

Safety bias: can we trust automation? Always...?

- We still need people
 - operate the automation
 - over-ride it if it malfunctions
- We need a team
 - Wallace needs Gromit, and
 - Gromit needs Wallace



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Safety bias: becoming over-trusting

People become over-reliant and over-trusting

not notice when it goes wrong

usability and user experience studies

air crashes caused by pilot over-trust of automatic pilot

Encourage people to continue to think!

Roger McKinley (one of the developers of the satnav) recently remarked “*My fear is that blindly following the commands of a satnav can generally make us less alert*” (I journal 20-05-16).

Who flies the plane?

<http://blogs.wsj.com/middleseat/2008/12/04/malcolm-gladwell-on-culture-cockpit-communication-and-plane-crashes/>

“...a contributing factor to the accident was the fact that two crewmembers failed to successfully communicate concerns to the captain that the plane was running low on fuel. They knew the plane would likely run out of fuel, but the captain didn’t get clued in...”

See also:

Malcolm Gladwell:

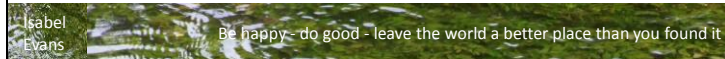
“Outliers”

Do you trust your automation?

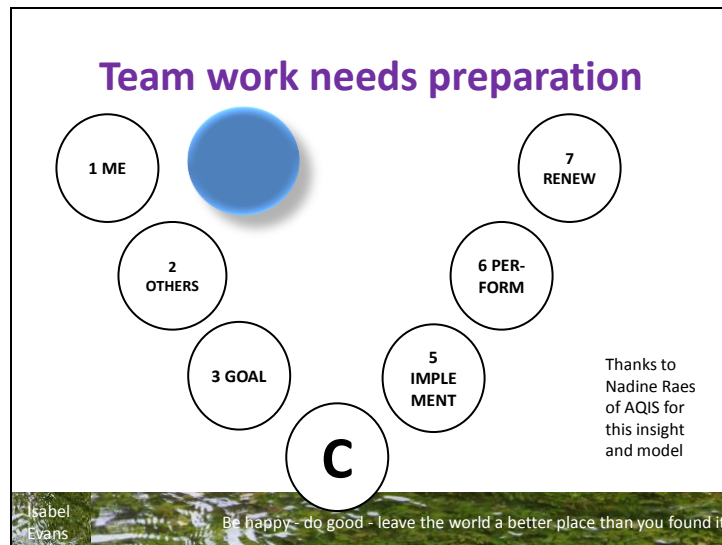
Software tester finding decision making not supported by IT toolset:

“The test tool marked all the tests as passed except 1, but in fact none of the tests marked “passed” had actually run”

Quote from Fewster and Graham “Experiences of Test Automation”



Slide 30: Teamwork – Drexler-Sibbert



80% of the success is due to preparation

We're here at the testing conference: before your team starts testing, test your team first

Imagine: you're starting a project with a team, you don't really know the people in the project well or at all: what happens typically?

This is the Drexler-Sibbert model for team work, I was introduced to it by Nadine Raes from AQIS.

See: <https://www.youtube.com/watch?v=WA3VkPHp2z0>

See: <http://aqis.be/>

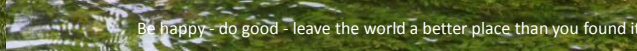

The model is summarized in words on the next page.

The model in words:

Step	summary	if unresolved
1. ME- step:orientation	WHY am I here?-> purpose Why am I here?-> identity within group Why are WE here?-> membership of group	If Unresolved: Disorientation Uncertainty Fear
2. OTHERS – trust building	Who are you? Understanding the others... Personalities... Think or feel? Talk it through or think it through? Detailed instructions or helicopter view? Make decisions quickly or postpone? Monitor steady progress or feel the adrenaline towards the end? Does the other one have the competencies? Open up to each other's talents and contributions Willing to share (info, expertise, cultural differences)	If Blocked in here: caution/façade/silence/skepticism mistrust
3. Goal clarification	WHAT are we doing? Clear understanding of the job Generate agreements about the goals and specific deliverables -> explicit assumptions (write them down) -> measurable objectives -> shared vision / imagine the success (sports)	If Blocked: skepticism/silence / irrelevant competition
4. Commitment	HOW will we do it? Committing to specific actions Making decisions about resources Being clear about roles	If Blocked: Unclarity -> dependent on leader Resistance Step 1 – 4: if blocked in these stages: like petanque ball – it won't bounce
5. Implementation	WHO does WHAT, WHERE and WHEN ? Scheduling & sequencing the work over time Clear processes Alignment with the purpose/goals Disciplined execution	If Blocked: conflict, blame,nonalignment & missed deadlines, disagreements about qual. standards
6. High performance	WOW - a flow state! Spontaneous interaction Synergy Surpassing their expectations on results (with hard work, practice, mastery of tools) ! Is not a stable state! Really important!	If Blocked: overload (workaholics) and disharmony (new members) – expressed discontent, stress, sickness
7. Renewal	WHY continue? Examine "lessons learned" Still needed? – changes? – back to step 1 If not: wrap up, recognize & celebrate and free team members to move on	If Blocked: boredom and burnout Signs: working day & night, over weekends over a long time, feeling underappreciated or disengaged

Clean workspaces

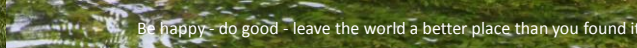

- Keep it clean!
 - Ship shape and Bristol Fashion
 - Back stage rules
 - Horticulture and garden sheds
- So – code, automation, tests?



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Information design

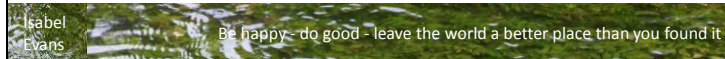
- People-centred, not tech-centred
- Apply Nielsen's Heuristics to the automation interfaces
 - <https://www.nngroup.com/articles/ten-usability-heuristics/>
- Apply information design models from Tufte to the reporting from the automation
 - <https://www.edwardtufte.com/tufte/>



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Quality viewpoints

- When designing automation, remember to consider all quality viewpoints:
 - Manufacturing
 - Product
 - User
 - Value
 - Transcendent




Slide 34: Exercise

**Have a go...
think
pair
share**

10 mins

- Is there hero-worship or demonization in your workplace?
- Any safety bias?
- When you built the automation team did you go through steps to build it?
- Did you include automation users?
 - People centred approaches?
 - Quality viewpoints?



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- Is there hero-worship or demonization in your workplace?
- Any safety bias?
- When you built the automation team did you go through steps to build it?
- Did you include automation users?
- People centred approaches?
- Quality viewpoints?

Slide 35: Action plan

Action plan

- What will you do as a result of this session?
 - This week?
 - This month?
 - This year?

Or do nothing!

Isabel Evans

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As a result of this session I will....

Slide 36

Three key points

- 1. Implementing automation and industrialization involves human factors of teamwork and beyond teamwork;
- 2. Other disciplines and industries have lessons we should apply to the industrialisation of our own industry;
- 3. Models exist to help us understand how to work with rather than against people in and affected by our projects.

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Slide 37

Human Factors for Test Automation (90mins)

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4th UCAAT User Conference on Advanced Automated Testing

ETSI World Class Standards

Budapest, 26-28 October 2016



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