

Human Factors in Change Work



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My journey so far...

Safety Research

Programme Design

Implementation



Outline of presentation

WHAT IS HUMAN FACTORS AND ERGONOMICS (HF/E)?

1

WHAT GETS IN OUR WAY OF LEARNING AND PROGRESS?

2

HOW CAN HF/E HELP US DESIGN SYSTEMS TO IMPROVE SUCCESS?

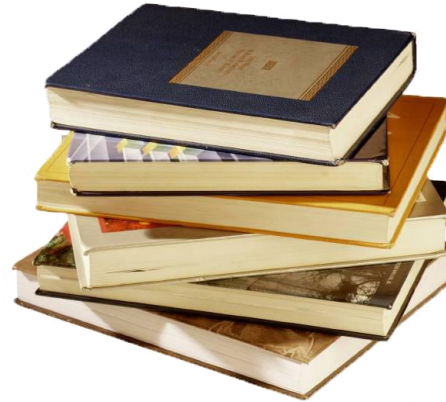
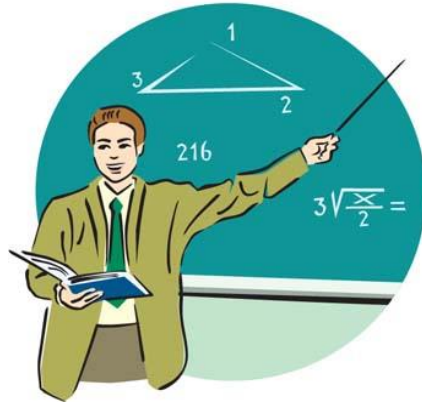
3

HOW CAN HF/E TOOLS HELP US WITH OUR CHANGE WORK?

4

1. What is human factors & ergonomics?



How much do you know about this topic?



Prevailing attitude

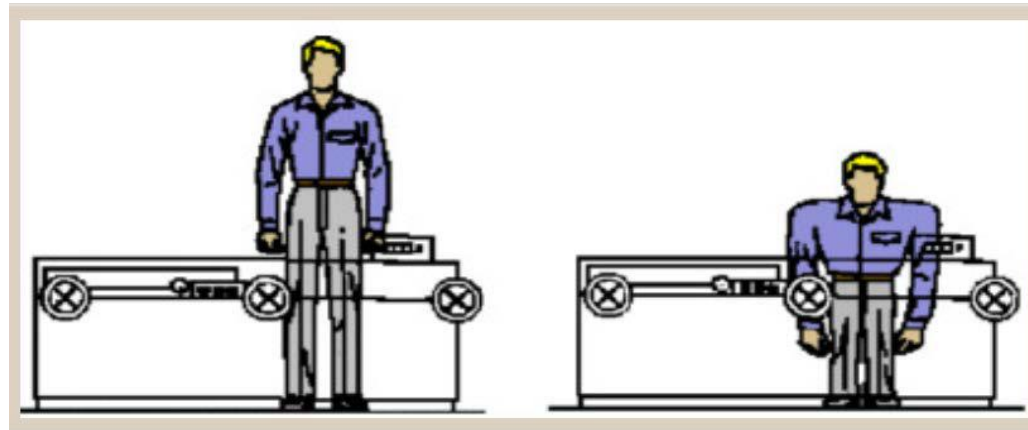


What's in a name...

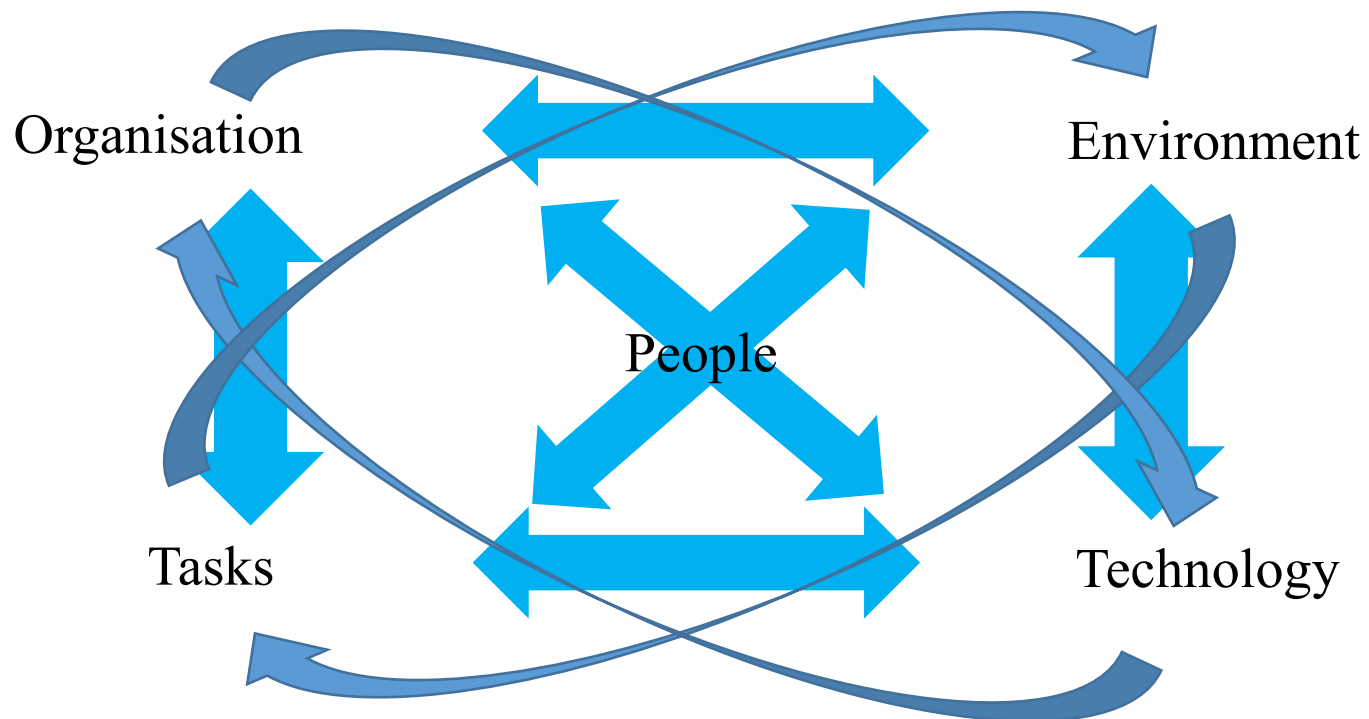
- NOT “The Human Factor” “Human Factors is”
- NOT “Human Factors are” “Contributory factors are” 
- **Human Factors and Ergonomics** = **synonymous terms**
- HF/E as a shortening 

Human Factors & Ergonomics (HF/E)

‘Understanding the interactions between people and all other elements within a system, **and design in light of this understanding**’

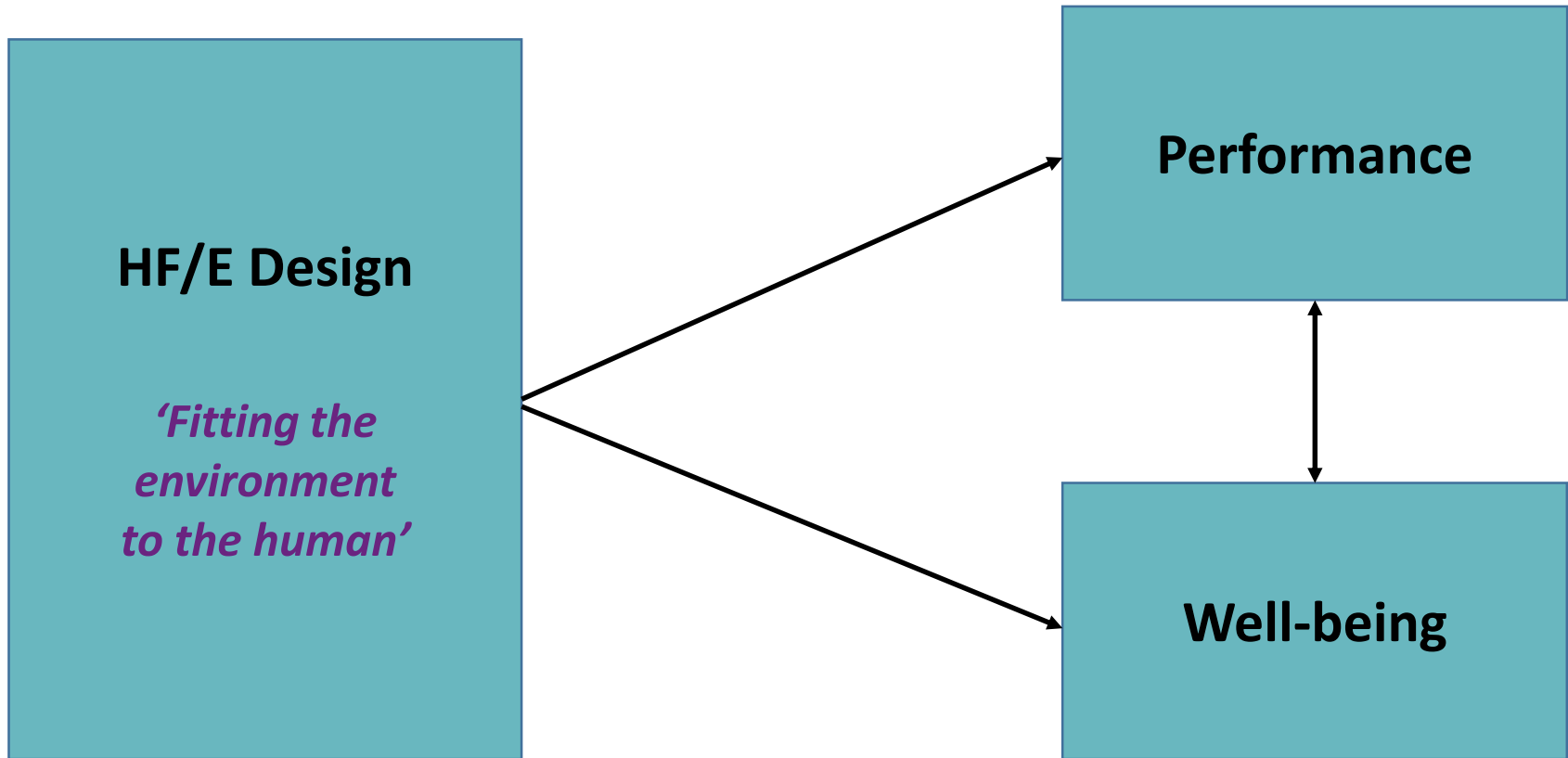


System elements



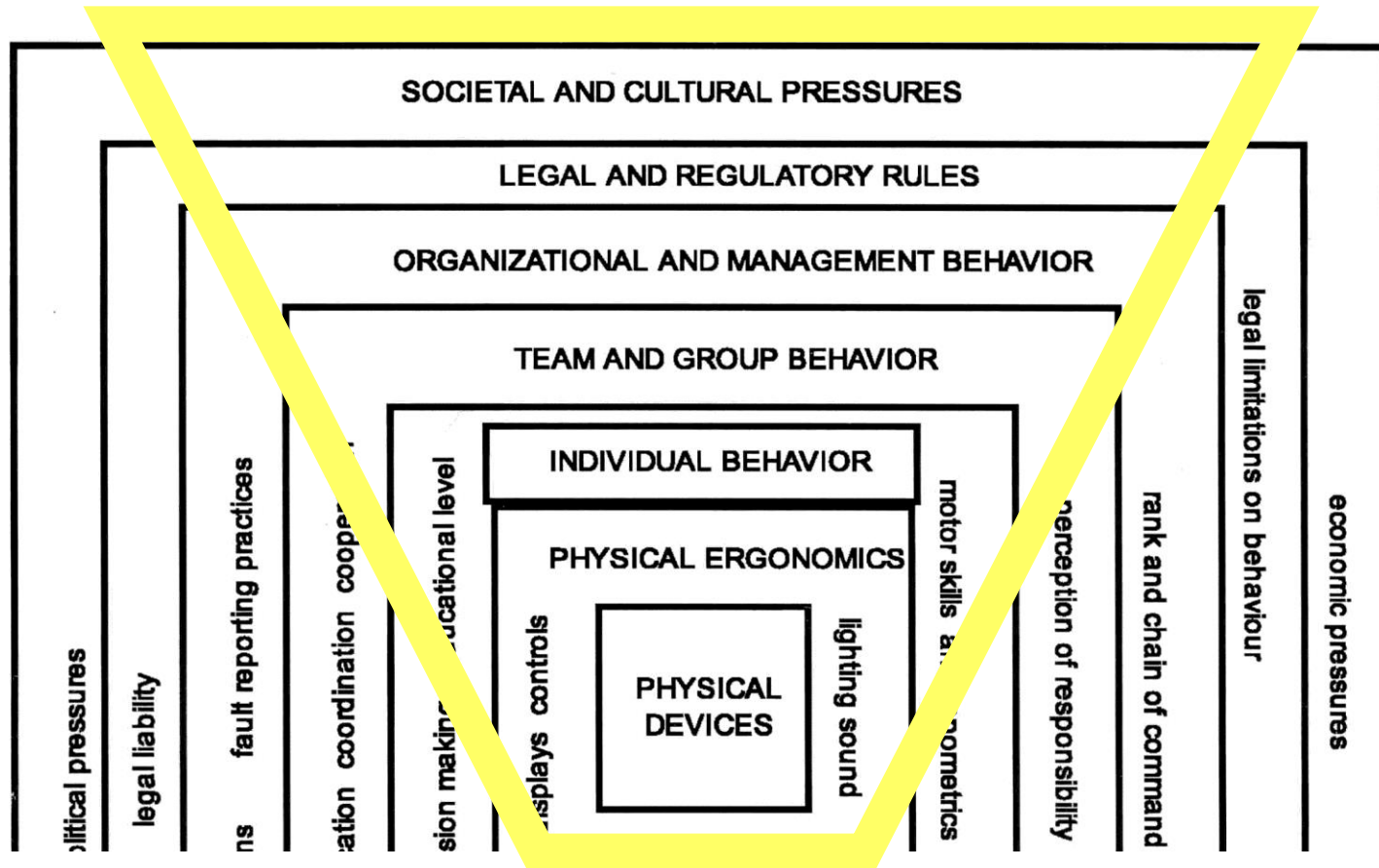
Carayon (2006)

Dual goal of HF/E



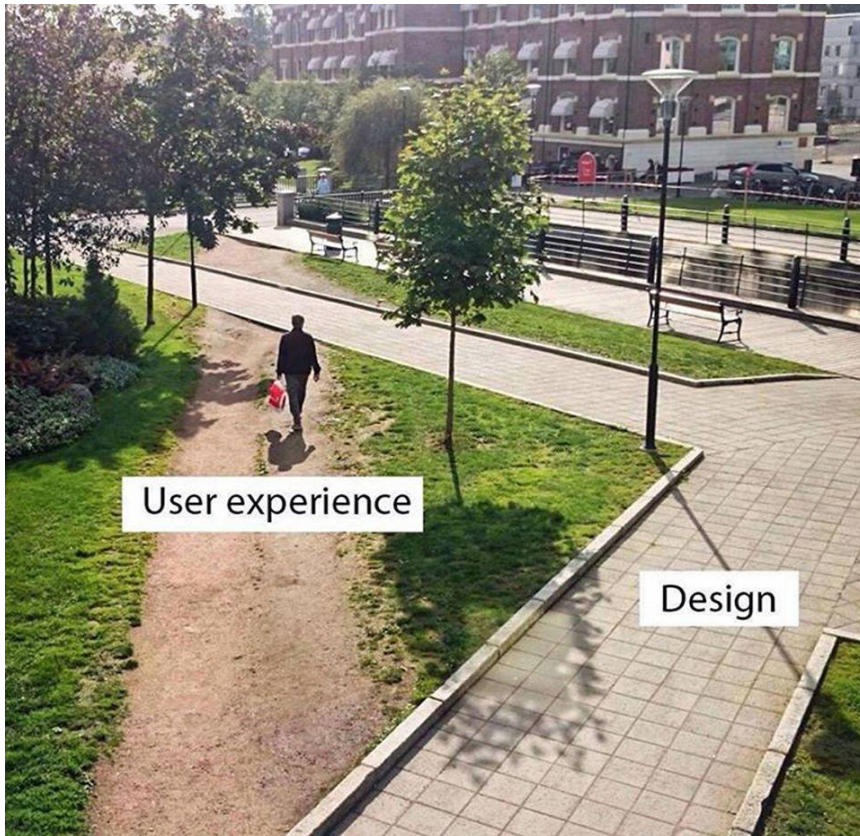
(IEA, 2000)

System levels



Moray (2000)

Prevailing approach





Setting people up to succeed



DESIGN systems so it's easy to do the right thing

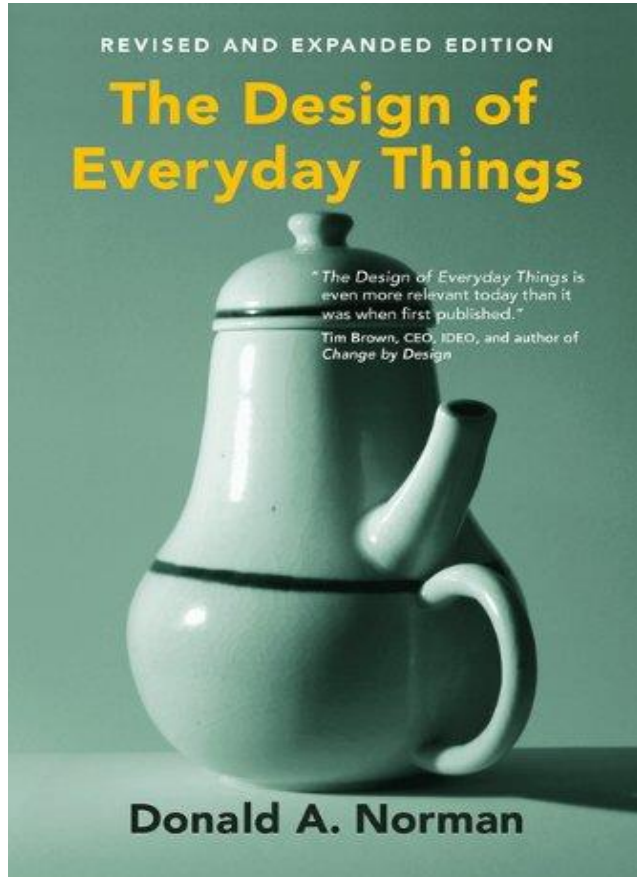
Make 'bad' things noticeable so that they can be recovered from

Ensure all potential 'end-users' are involved in design

Consider the capabilities, strengths, limitations and needs of users

Understand how people make their jobs work (most of the time)

DESIGN of tasks, tools, equipment, systems



(Norman, 1981)

Medical device example



(Fairbanks, 2007)

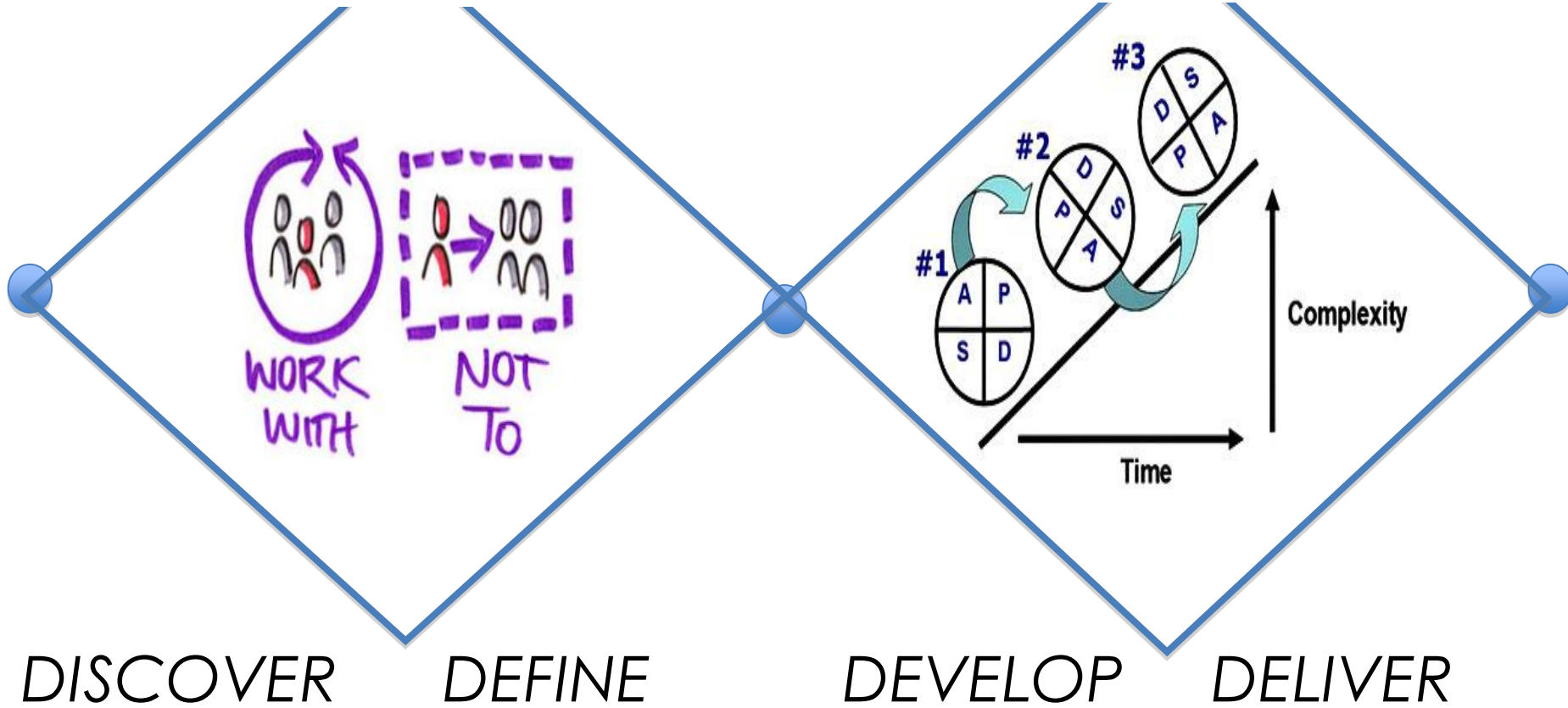
USABILITY (of all tools not just tech side)

1 SI Simplicity	10  PE Prevent Errors	9 MCL Minimize Cognitive Load	8 PC Preservation of Context
2 Na Naturalness			7 EIP Effective Information Presentation
3 Co Consistency	4 FoF Forgiveness and Feedback	5 EUL Effective Use of Language	6 EI Efficient Interactions

Double Diamond

FINDING PROBLEMS

TESTING SOLUTIONS



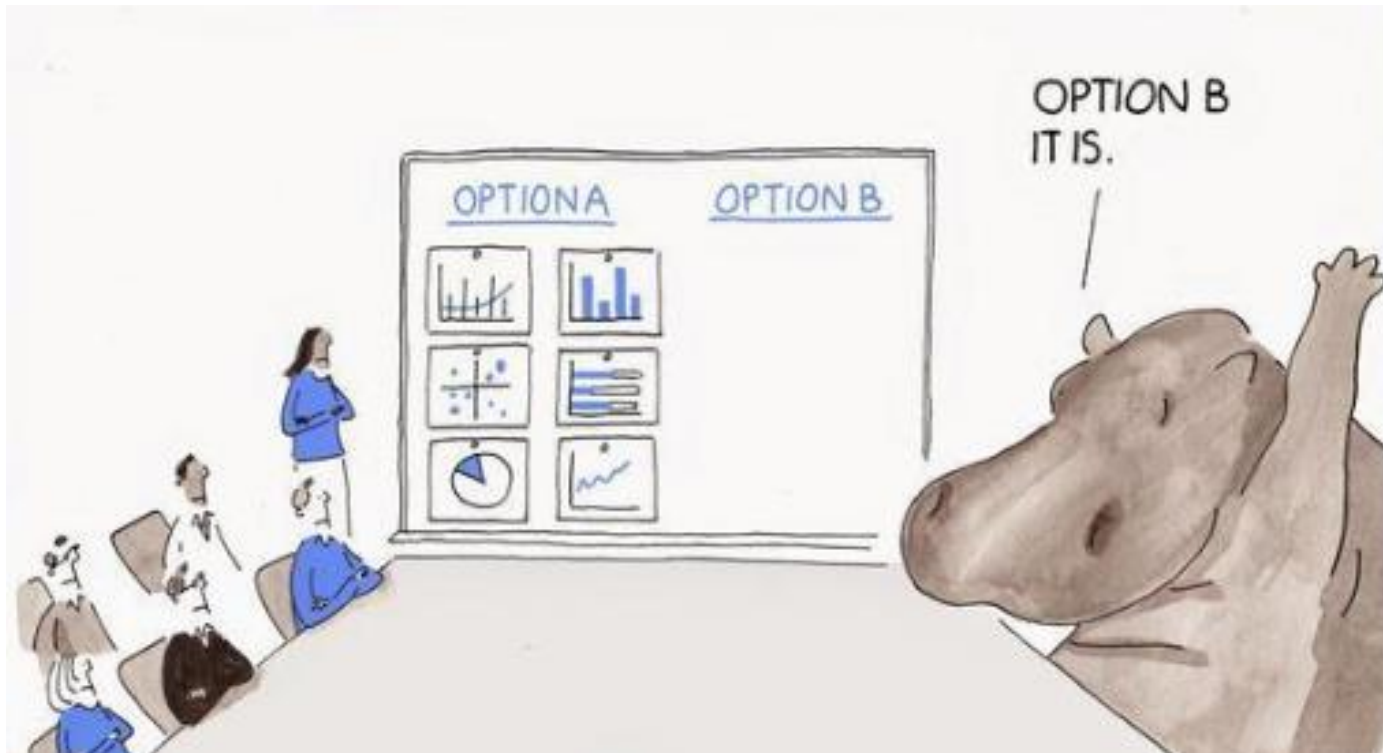
2. What gets in the way of our learning?

What do we look for?

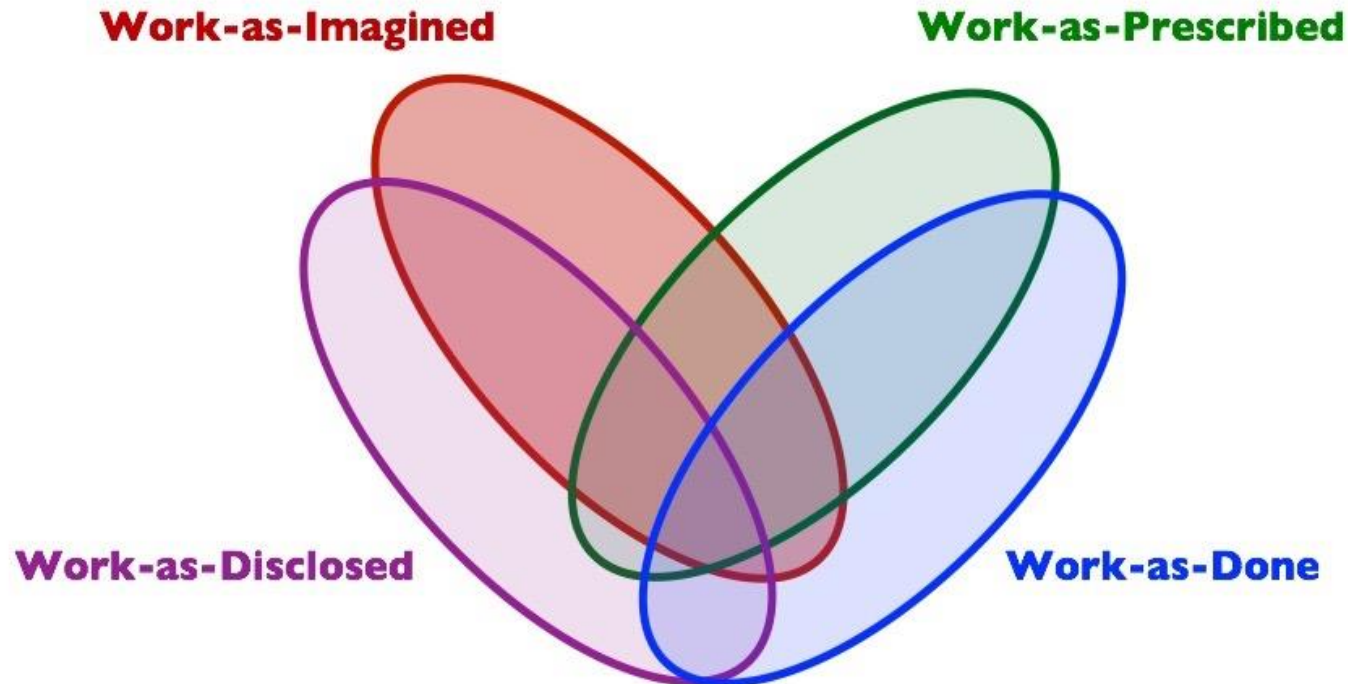
Unfortunately, this is how the brain works:



Who do we listen to?



What should we expect?

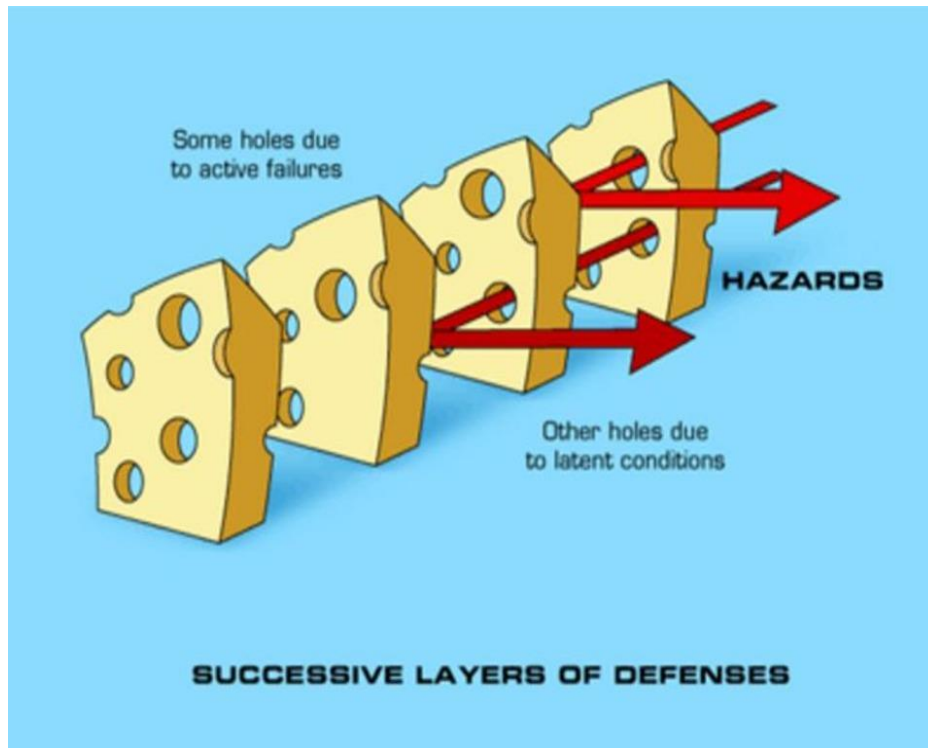


Who do we exclude?

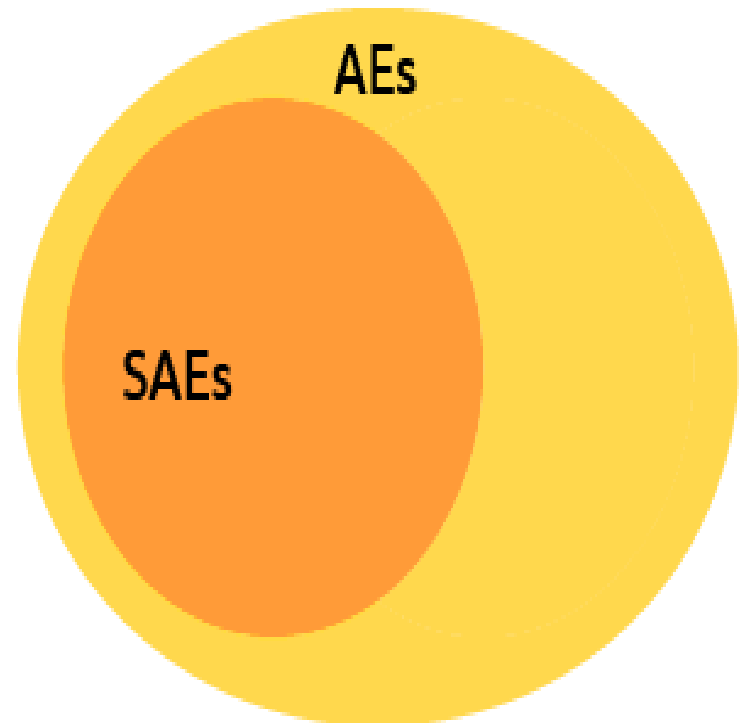


(Wu, 2000)

What do we miss?



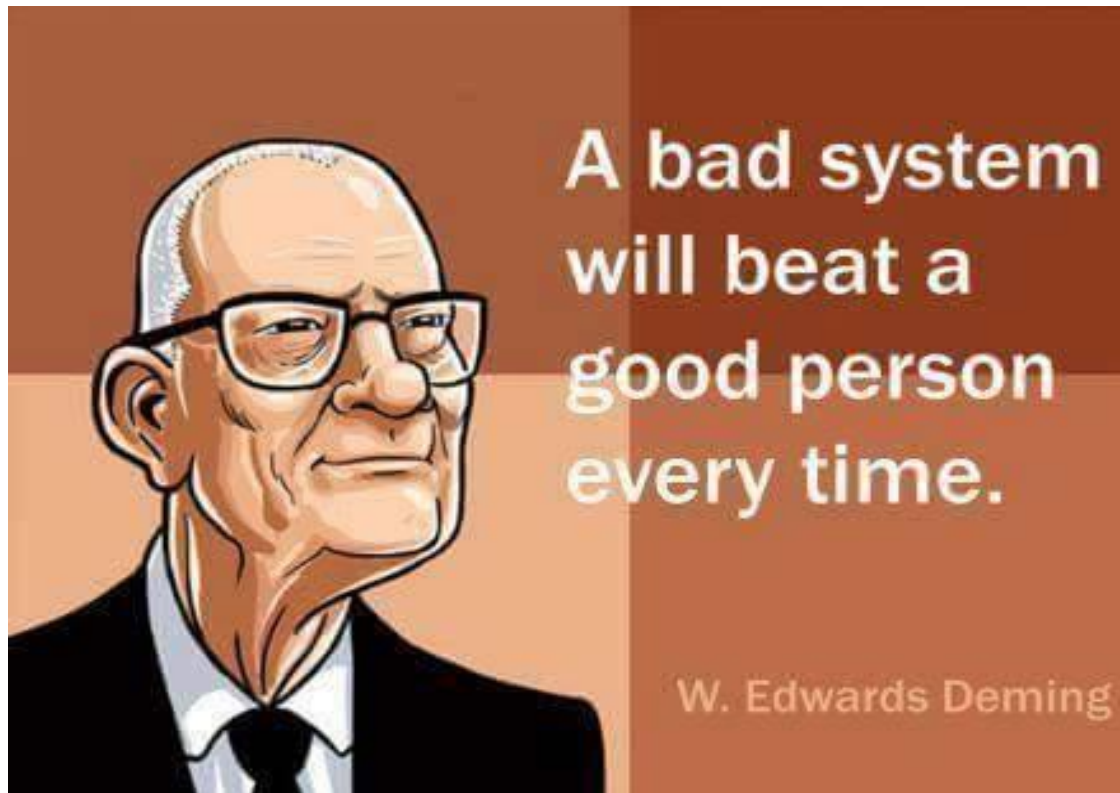
(Reason, 1997)

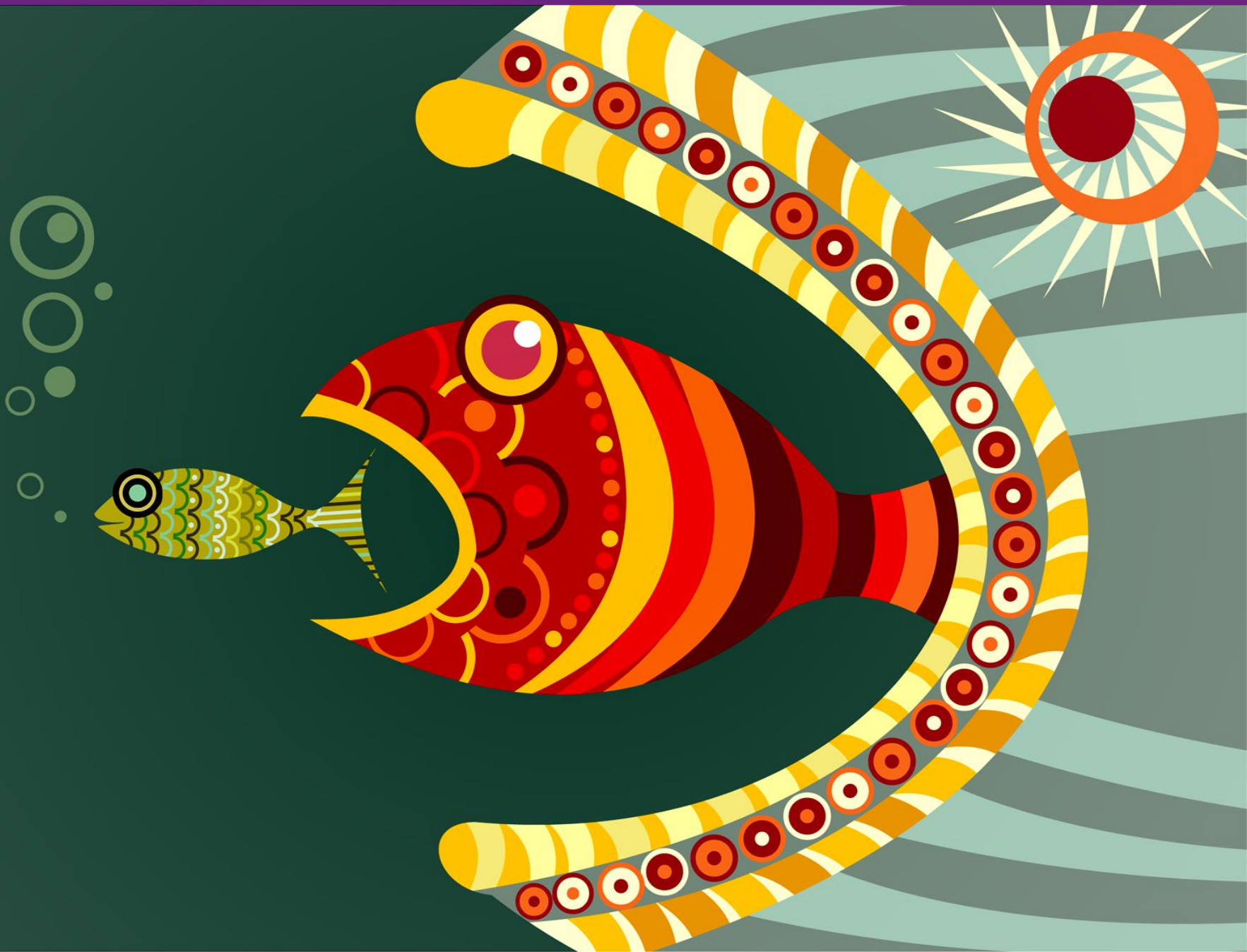


(Weick & Sutcliffe, 2011)

3. How can HF/E help us design better?

Wisdom from a QI guru...

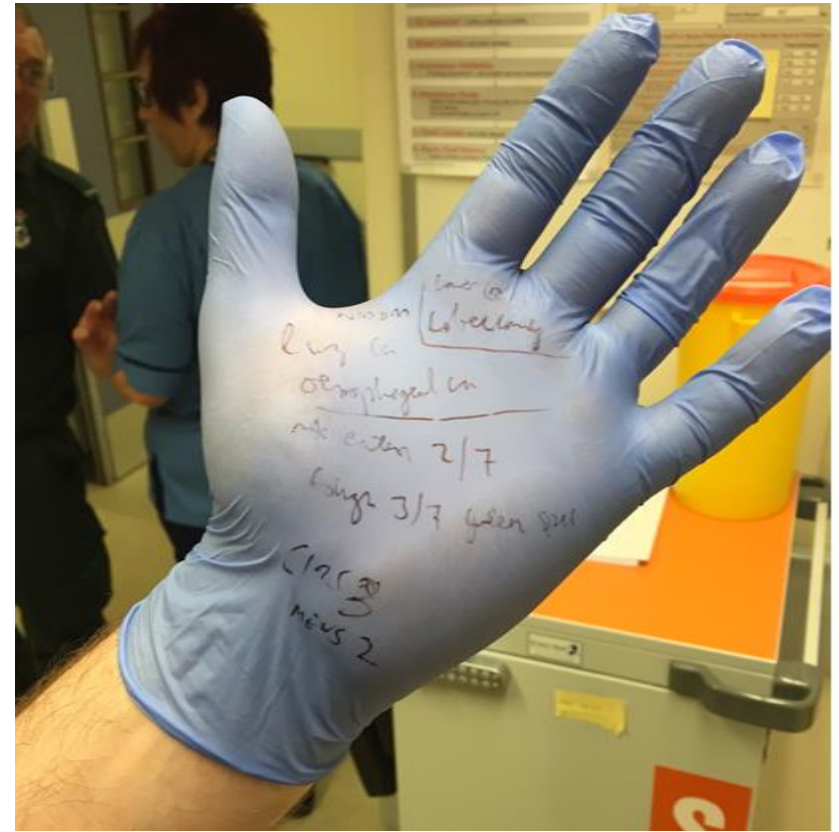




Example 1: Debriefing in theatres



Example 2: Paramedic handover



Designing for 'work as done'



Example 3: Retained swabs

A photograph of a person in a blue scrub top and hairnet writing on a whiteboard. The whiteboard has a table with columns for 'Name', 'Radio swabs', 'Raytec', 'Plylets', 'TAPES', and 'AIR'. The person is writing the number '5' in the 'Radio swabs' column for the 'OTHER' row.

Name	Radio swabs	Raytec	Plylets	TAPES	AIR
A N	5	5			
OTHER	5	5			



Making it easy to do the right thing



Theatre 5		Today's Date	Patient's Name
		<input type="text"/>	<input type="text"/>
SWAB COUNT			
10 x 10	<input type="text"/>	Allergies	
22 x 22	<input type="text"/>		
	<input type="text"/>		
Mastoids	<input type="text"/>	Throat Pack	
Packs 45 x 45	<input type="text"/>	IN	OUT
Pledgets	<input type="text"/>	<input type="text"/>	<input type="text"/>
Blades	<input type="text"/>	<input type="text"/>	<input type="text"/>
Sutures	<input type="text"/>	<input type="text"/>	<input type="text"/>
Reels	<input type="text"/>	<input type="text"/>	<input type="text"/>
Hypodermics	<input type="text"/>	<input type="text"/>	<input type="text"/>
Bulldogs	<input type="text"/>	<input type="text"/>	<input type="text"/>
Slings	<input type="text"/>	Tourniquet Times	
Other	<input type="text"/>	On	Off
	<input type="text"/>	Arm Left <input type="text"/>	<input type="text"/>
	<input type="text"/>	Arm Right <input type="text"/>	<input type="text"/>
	<input type="text"/>	Leg Left <input type="text"/>	<input type="text"/>
	<input type="text"/>	Leg Right <input type="text"/>	<input type="text"/>

Example 4

25/10/2010			<p>The Datix reporting software is very time consuming to fill in, and puts me off reporting incidents. Many features of the interface are slow and annoying to use e.g. not being able to type "M" for male. AMU does not seem to appear as a location. How are we end users meant to know which manager to assign an incident to? I worry also that incidents may only be assigned importance if harm has occurred - a child on a cliff edge may escape unharmed, but the risk should not be repeated e.g. earlier today I reported on a man who had been missed on a post take ward round - he was unharmed, but the risk should not be repeated.</p> <p>Reporting the incidents today was so slow that I amalgamated a number into one report, but still started clinic late.</p> <p>How does a non PC user or a user lacking in confidence report an incident?</p>
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4. How can HF/E tools help with QI work?

CHALLENGE 1: Picking “collaborators”

- Concern over who makes decisions and does what
- Blaming others for not getting the job done
- Lack of action because of ineffective communications
- A “Them-us” attitude, so “not sure, so take no action”
- Multiple “stops” needed to find an answer to a question
- Lack of required expertise to meet goals
- Command and control rather than co-design

Example (1)

Responsible

- The person who actually carries out the process or task assignment
- Responsible to get the job done

“The Doer/s”

Accountable

- The person who is ultimately accountable for process or task being completed appropriately
- Responsible person(s) are accountable to this person

“The Buck Stops Here”

Consulted

- People who are not directly involved with carrying out the task, but who are consulted
- May be stakeholder or subject matter expert

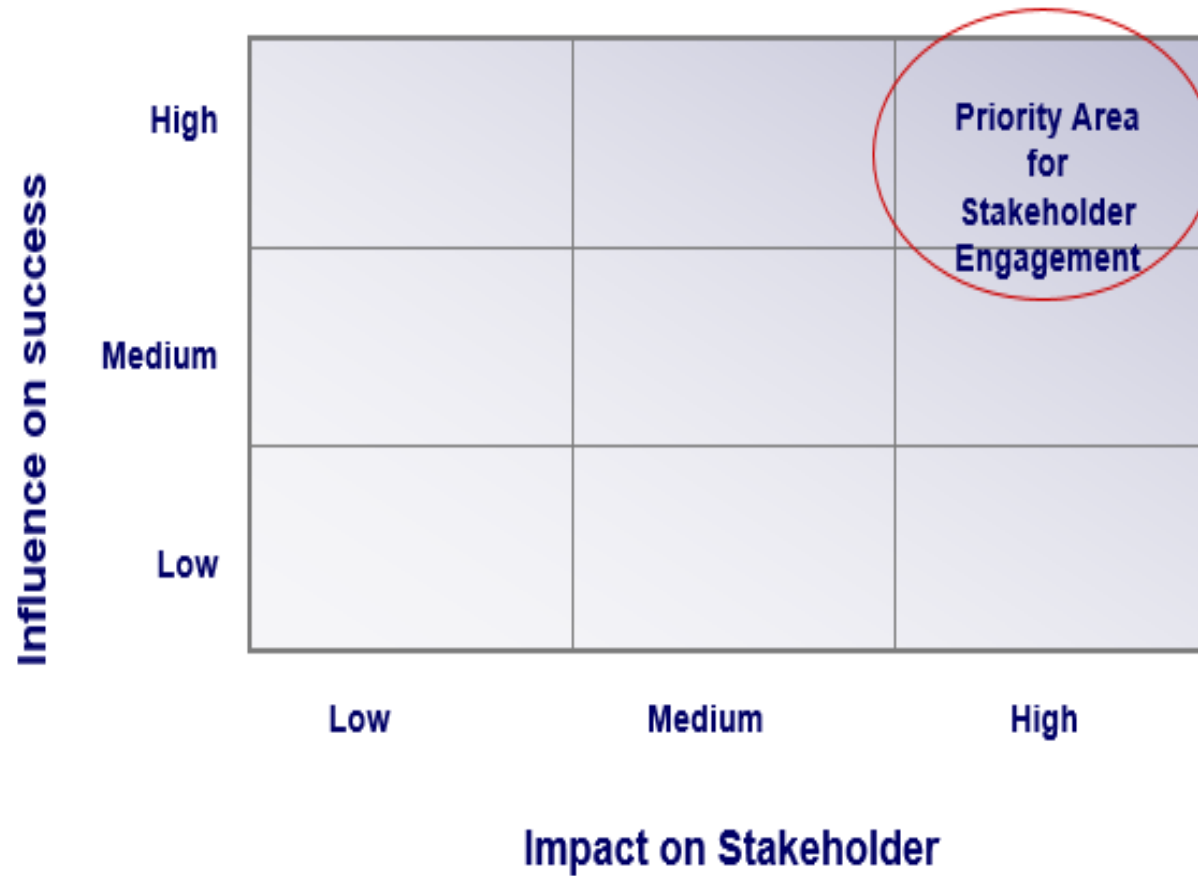
“In the Loop”

Informed

- Those who receive output from the process or task, or who have a need to stay informed

“Keep in the Picture”

Example (2)

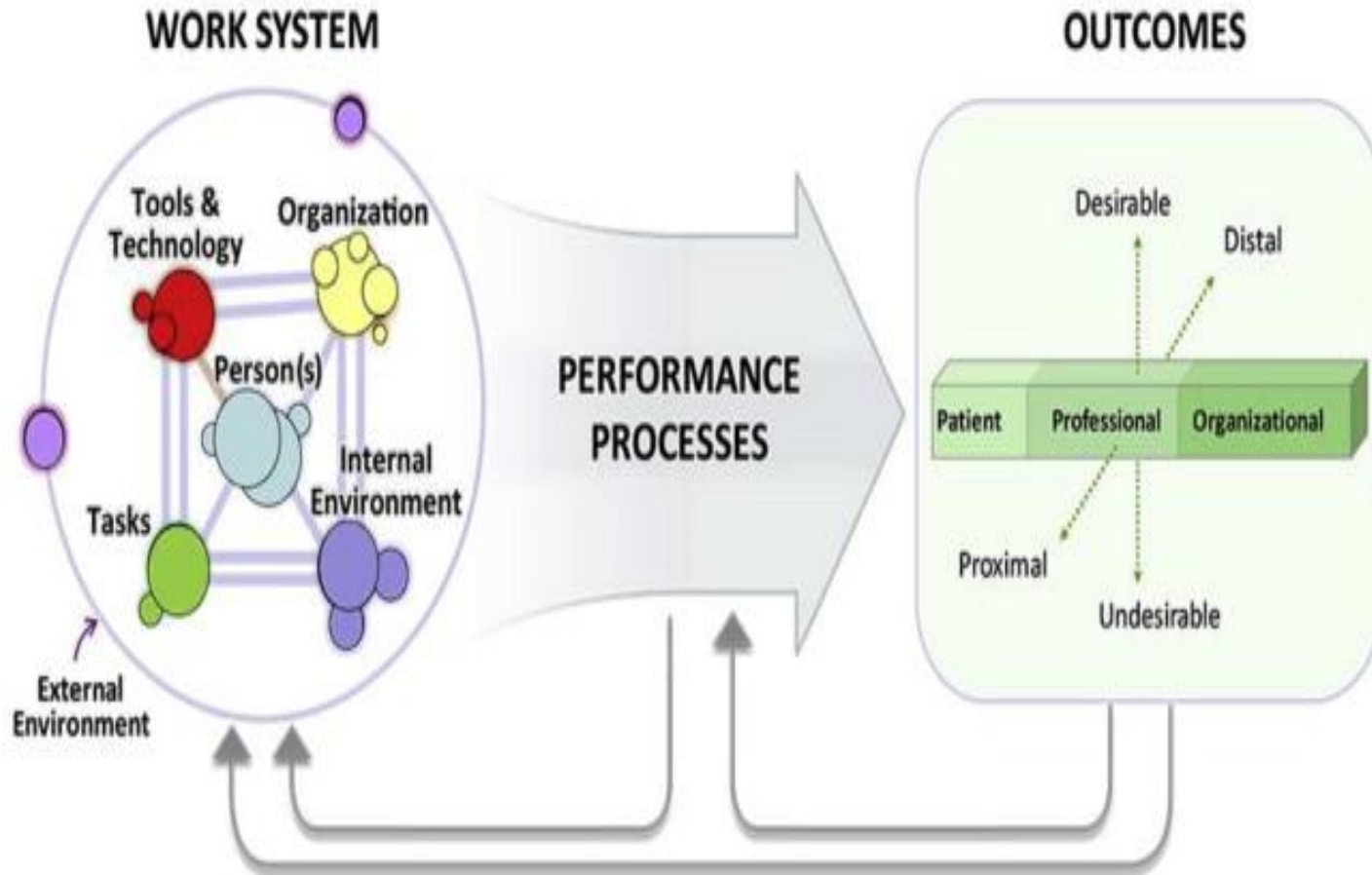


CHALLENGE 2: Picking “problems”

- Making assumptions that you understand the problem
- Not getting multiple views
- Not digging into the “second story”
- Remaining fixated on only one part of the system
- Considering only the impacts on you/your staff
- Thinking you have the answer before you gather evidence
- Using anecdotal feedback as the basis of decisions

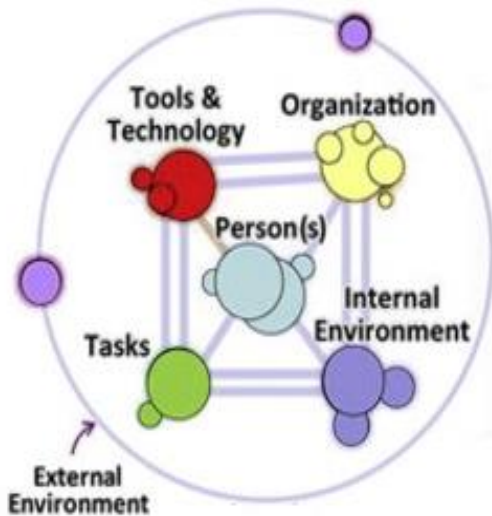
SEIPS* model

*Systems Engineering Initiative for Patient Safety



(Carayon, 2006)

Work system



Component	Elements (examples)
PERSON	Education, skills and knowledge Motivation and needs Physical characteristics Psychological characteristics
ORGANISATION	Team coordination, collaboration and communication Organizational culture and patient safety culture Work schedules Social relationships Supervisory and management style Performance evaluation, rewards and incentives
TECHNOLOGY & TOOLS	Various IT systems: EHR, CPOE and bar coding Medical devices Other technologies and tools (documentation) Usability / user interaction issues
TASKS	Nature and range of core tasks around an activity Job content, challenge and utilisation of skills Autonomy, job control and participation Job demands (e.g. workload, time pressure, bandwidth)
ENVIRONMENT	Layout Noise Lighting Temperature, humidity and air quality Work station design

Example (1)

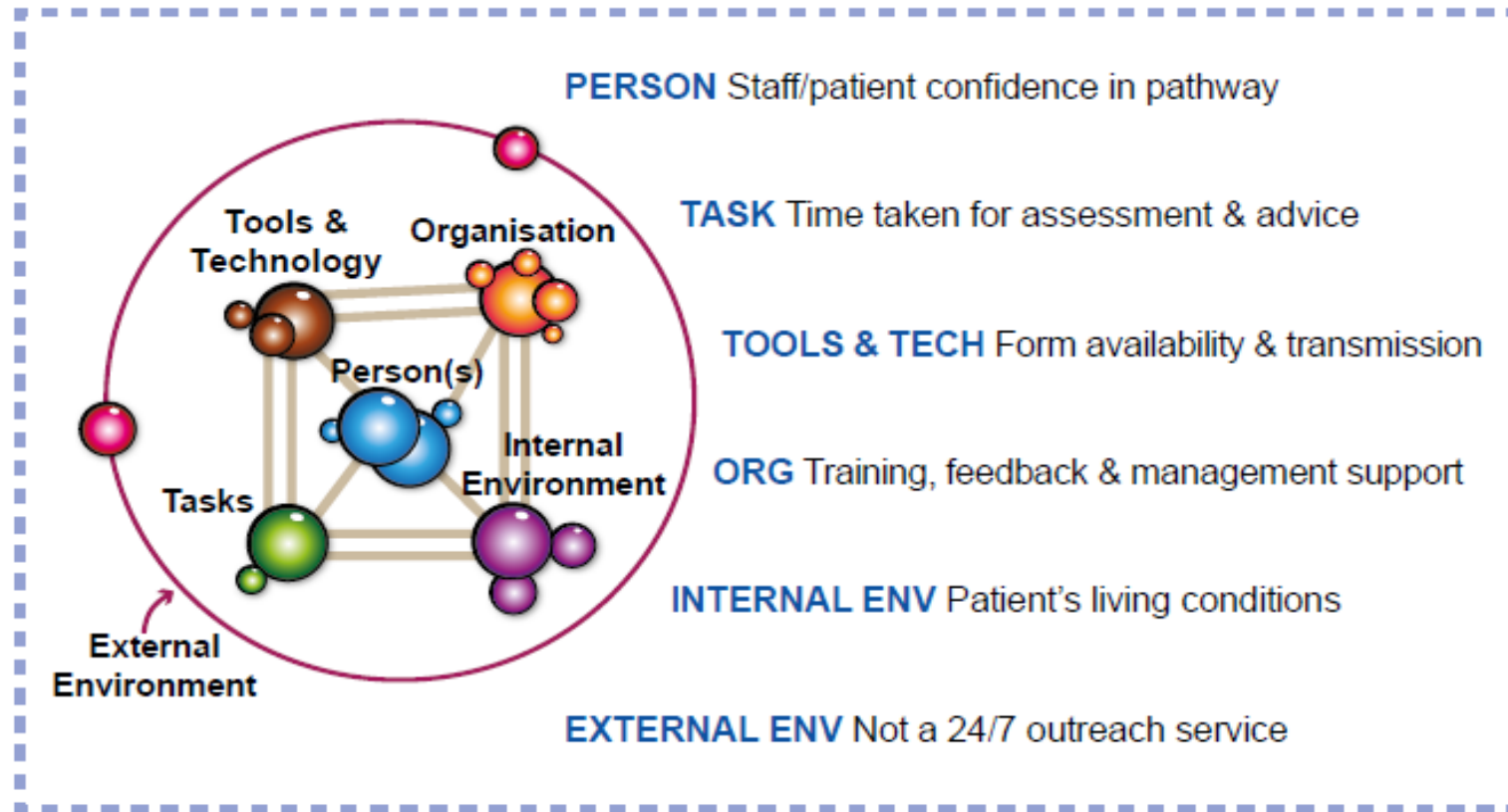
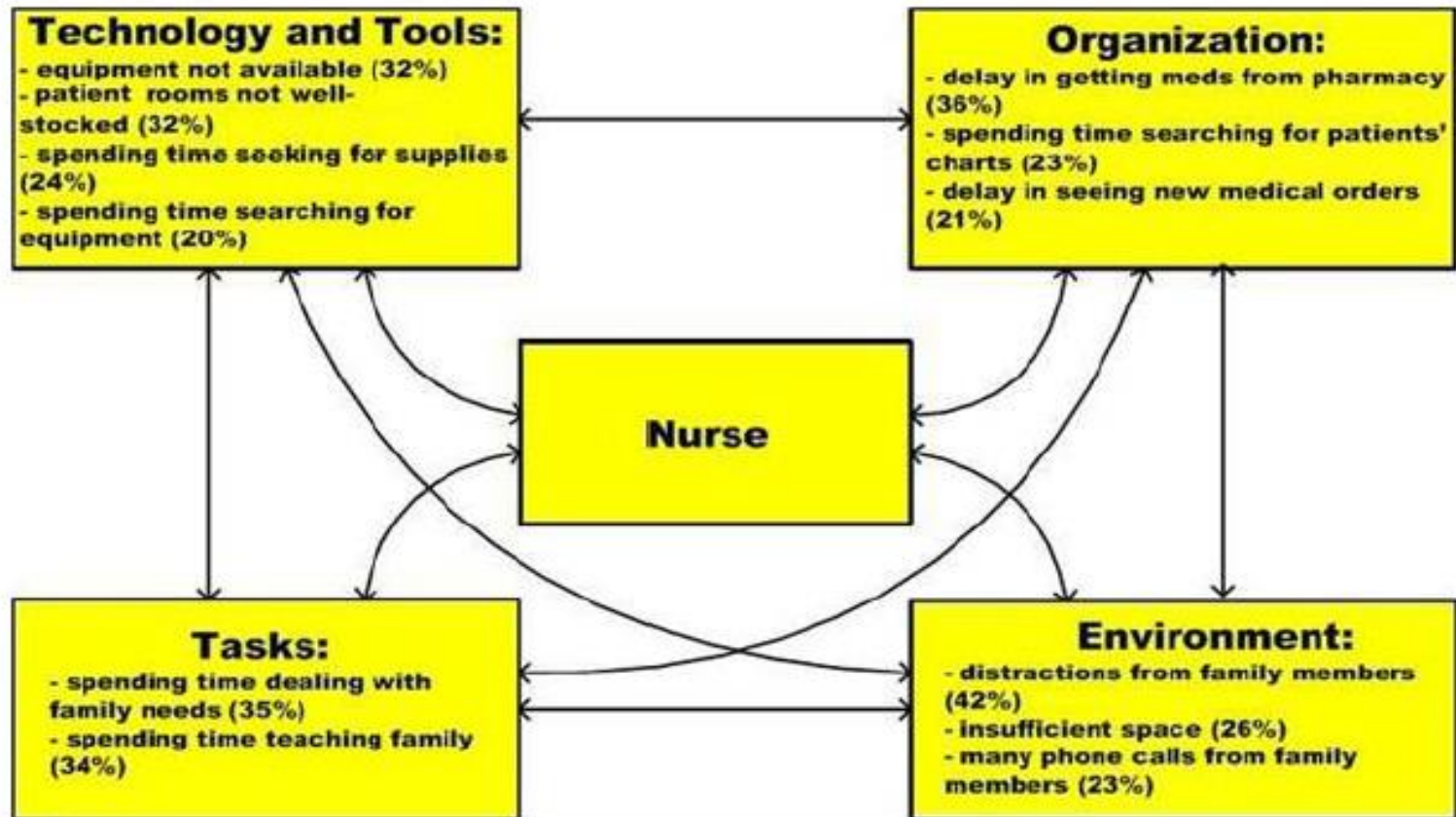


Figure 2: Work System Elements that impact on development of Falls & Frailty Pathway

Example (2)



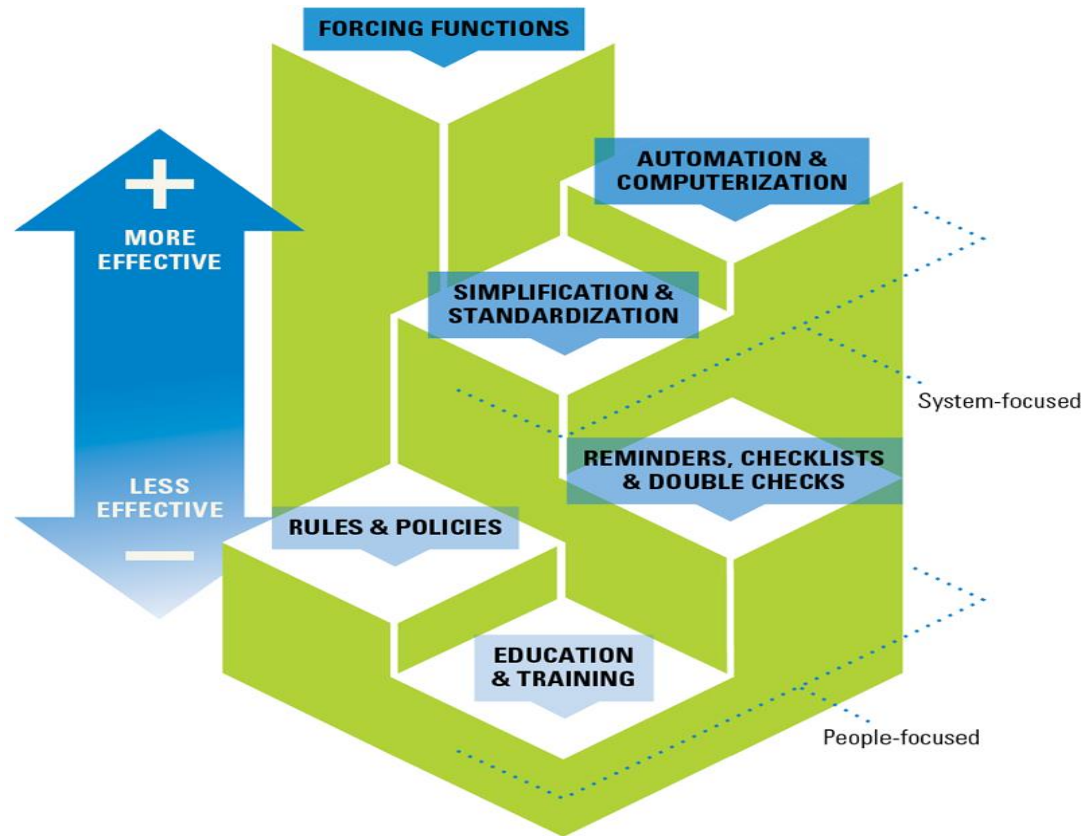
Example (3)

PERSON <i>e.g. skills, knowledge, motivation, professionalism.</i>	ORGANISATION <i>e.g. teamwork, culture, collaboration, work schedules, supervision, guidelines.</i>	TECHNOLOGY/TOOLS <i>e.g. equipment, devices, IT and usability issues.</i>	TASKS <i>e.g. workflow, job content, workload, time pressure, participation, autonomy.</i>	ENVIRONMENT <i>e.g. layout, noise, space.</i>
<ul style="list-style-type: none"> - Staff may not be duly vigilant when checking patient details are consistent on consent forms and the checklist and errors made when marking up the correct operative site by surgeons - Problem with inexperienced and locum staff potentially left to handle large numbers and/or complex patients, under times of low staffing - Surgeons not making themselves accessible and not communicating where they are going and will be back to theatre etc. 	<ul style="list-style-type: none"> - Breakdown of communication between the ward and theatres with impacts on patient experience re long wait and cancelled surgery - Errors from the waiting list office on listed operations which do not match the operation which needs to take place for the patient could result in error, e.g. wrong operation and wrong site - Delays on wards resulting in delays in theatre and potential overruns. 	<ul style="list-style-type: none"> - Consistent problems with trolleys not being functional with resultant problems during surgery, i.e. patient in wrong position, difficult for surgeons - Non sterile instruments being sent up and only discovered with patient on table ready for operation, e.g. bone material visible on screw system 	<ul style="list-style-type: none"> - Wrong labels placed in notes resulting in confusion of two patients and positive patient ID processes not carried out to identify error - Tasks not finished in theatre in rush to get patient back to ward and out of recovery - Lack of maintenance on equipment to keep charged for patient use, e.g. Alaris PK pump for infusion of drugs stopped working during surgery 	<ul style="list-style-type: none"> - Problem with lights not functioning and poor lighting for surgeon in theatre

CHALLENGE 3: Picking “solutions”

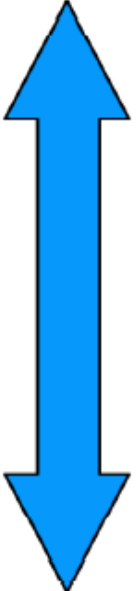
- Focusing on symptoms and not causes
- Thinking that people are the easiest part to change
- Believing that talking to people will make them change!
- Focusing on externally imposed timelines for action
- “Quick and dirty” 😞 (HINT: there are no “quick wins”)
- Not starting with why and bringing people with you
- Thinking one thing can fix it or no-one has tried it before

Hierarchy of Interventions



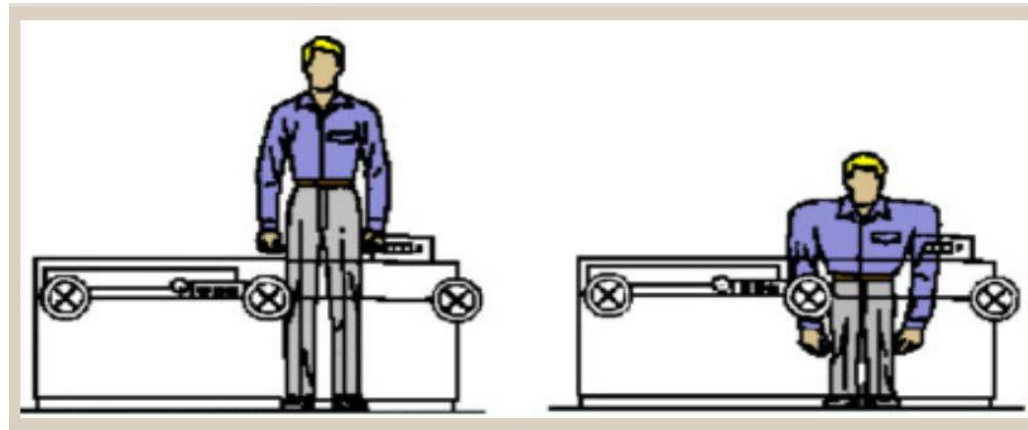
(Runyan, 2003)

Example (1)

HIGH	<i>Level of Effectiveness</i>	<i>Potential Intervention</i>	<i>Rationale / Measures</i>
	New equipment	Plastic drape with multiple welded plastic pockets in polyethylene	Visual check to separate the swabs, which can be referred to later if final count is discrepant
	Counts boards	Standardisation in the way swab boards in Lothian look and of the process to record and update	There is variability across Lothian and there needs to be a standardised, agreed process
	Safety huddles and debriefing	Any issues surrounding counts need to be discussed and lessons shared within & between theatres	Numbers of Datix and debriefing issues from boards recorded, themed and feedback in huddles
	Handover	If scrub practitioner needs to be replaced during procedure, a complete count should be performed and recorded	Limited situation awareness and vigilance to counts during the case with a focus on final count
	Non-technical skills	Training whole teams to improve coordination and communication, with count discrepancy scenarios	Evaluation and assessment of learning and knowledge retained. Structured feedback
	Pre-list briefing	This should discuss the staff allocation to scrub and count which should remain consistent throughout the procedure	Whole team approach which includes clinical support workers who do not sign-off counts but contribute to them in long cases
	Induction	Local count policy must be included in new staff orientation	Short mandatory assessment (to include unregistered staff)
	LOW		

Human Factors & Ergonomics (HF/E)

‘Understanding the interactions between people and all other elements within a system, **and design in light of this understanding**’



Wilson (2014)

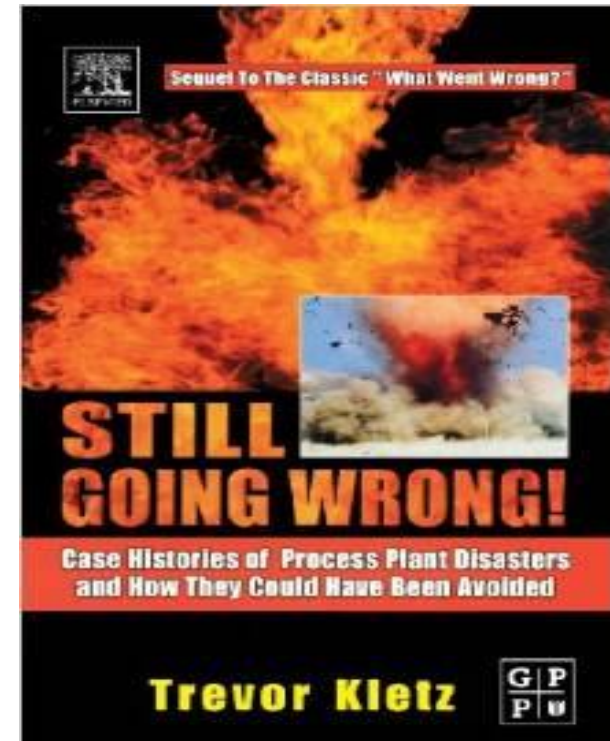
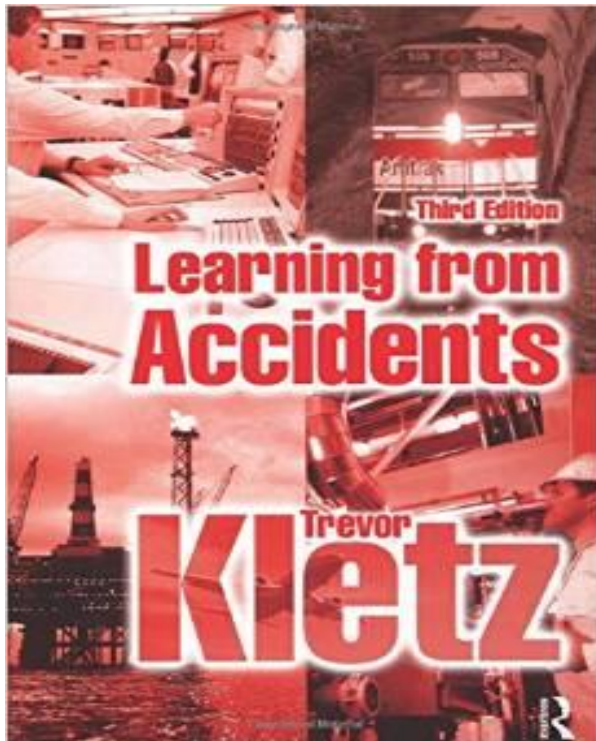
My dream for the NHS...

I do human factors

As an airline pilot, I sit at the front of an aircraft that passes through the upper atmosphere at close to the speed of sound. My immediate thoughts are about 100 miles ahead. My longer-term thoughts may be many thousands of miles ahead. All the time I can only do what I do because of an amazingly complex aviation system that somehow “understands” the nature of humans within it. It understands how to make my job easier. It understands how to present me with information. It understands how not to distract me up until I need distracting. It understands, in simple terms, how to make it easy to do the right things.

Bromiley (2016)

We are all on a journey!



Reading 1:

The science of human factors: separating fact from fiction

Alissa L Russ,^{1,2,3,4} Rollin J Fairbanks,^{5,6,7} Ben-Tzion Karsh,^{*8}
Laura G Militello,⁹ Jason J Saleem,^{1,2,3,10} Robert L Wears^{11,12}

- HF is about designing systems
- HF aims to fit and support people
- HF is about all levels of a system
- HF is a scientific discipline
- HF requires multidisciplinary expertise

Reading 2:

From Discovery to Design: The Evolution of Human Factors in Healthcare

Joseph A. Cafazzo and Olivier St-Cyr

FIGURE 1.
Human Factors Considerations



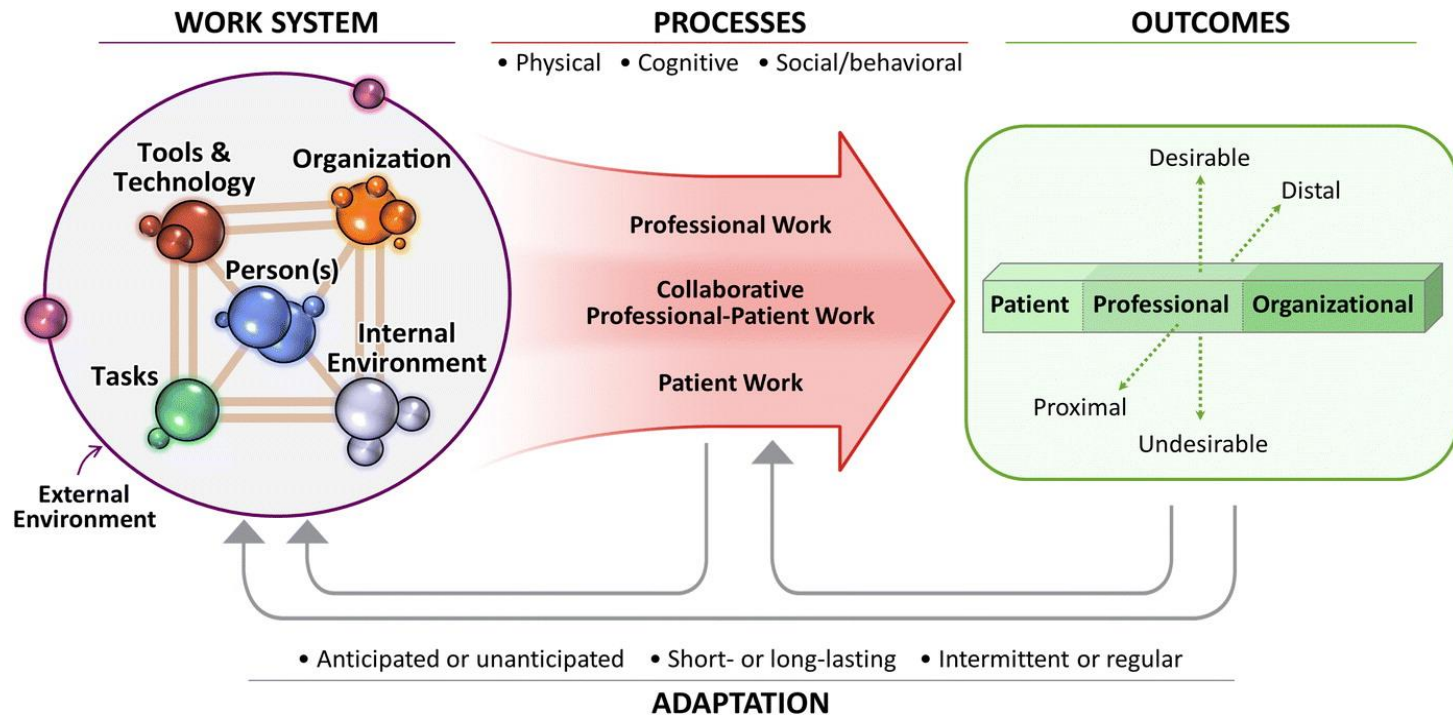
Reading 3:

SAFETY BY DESIGN

Work system design for patient safety: the SEIPS model

P Carayon, A Schoofs Hundt, B-T Karsh, A P Gurses, C J Alvarado, M Smith, P Flatley Brennan

Qual Saf Health Care 2006;15(Suppl 1):i50-i58. doi: 10.1136/qshc.2005.015842





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