

NES Medical Education Conference (April 2018)

# How to embed Human Factors & Ergonomics (HFE) principles in healthcare safety and improvement education

**Helen Vosper** PhD FHEA

Robert Gordon University, Aberdeen, UK

**Sue Hignett** PhD C.ErgHF

Loughborough University, UK

**Paul Bowie** PhD C.ErgHF FRCPEd

NHS Education for Scotland, Glasgow, UK ([paul.bowie@nes.scot.nhs.uk](mailto:paul.bowie@nes.scot.nhs.uk); Twitter: @pbnes)



**Safety, Skills  
& Improvement**  
Research Collaborative

# Workshop Background/Purpose

- Context - National Development Work in Scotland
- Human Factors/Ergonomics (HFE) concepts should be central to Patient Safety and Quality Improvement Education and Practice
  - To offer guidance as 'Tips' to educators on embedding HFE principles and methods in healthcare curricula and programmes
  - To explore current gaps in HFE education provision within healthcare curricula
  - To highlight potential learning needs of educators around embedding HFE principles in existing curricula/programmes

# Healthcare Curricula/Programmes?

- Undergraduate
- Postgraduate e.g. foundation years, specialty training
- Appraisal and CPD
- Clinical skills / Simulation / Team Training
- National training courses e.g. SQSF
- National safety and improvement programmes e.g. SPSP
- Local Patient Safety/QI/Induction training
- etc

# Context and Problem

## Human Factors Myths and Misunderstandings in Healthcare?

BMJ Quality & Safety Online First, published on 30 November 2011 as 10.1136/bmjqs-2011-000421

Viewpoint

### Time to accelerate integration of human factors and ergonomics in patient safety

Ayse P Gurses,<sup>1</sup> A Ant Ozok,<sup>2</sup> Peter J Pronovost<sup>1,3</sup>

Downloaded from <http://qualitysafety.bmj.com/> on October 30, 2014 - Published by [group.bmj.com](http://group.bmj.com)

EDITORIAL

### Spreading human factors expertise in healthcare: untangling the knots in people and systems

Ken Catchpole

Downloaded from <http://qualitysafety.bmj.com/> on October 30, 2014 - Published by [group.bmj.com](http://group.bmj.com)

VIEWPOINT



OPEN ACCESS

### The science of human factors: separating fact from fiction

Alissa L Russ,<sup>1,2,3,4</sup> Rollin J Fairbanks,<sup>5,6,7</sup> Ben-Tzion Karsh,<sup>\*8</sup> Laura G Militello,<sup>9</sup> Jason J Saleem,<sup>1,2,3,10</sup> Robert L Wears<sup>11,12</sup>

- Published evidence
- Policy documents
- Conference presentations
- Professional chat with NHS colleagues & Academics etc

...several misconceptions about human factors science are beginning to take root in peer-reviewed medical literature.. some papers refer to ‘human factors’, yet point to the ‘failures’ of people as the underlying cause of adverse events or broken healthcare delivery processes - **a stance that is contrary to human factors science** and counterproductive for advancing safety.

‘human factors’ can sometimes be mistakenly equated with ‘training’ or ‘non-technical skills’ and confused with strategies intended to change human behaviour

When a review of a patient safety event leads to a determination that the cause is ‘human error’, it is not uncommon for healthcare organisations to try and modify the behaviour of the individual or group through counsel or retraining

‘human factors’ as one of the root causes of sentinel event data,

## ‘Human Factors’ v ‘factors of the human’

*‘the whole thing was caused by human factors.....it’s all about behaviours, you know’...‘....it’s all about the human factors’...human factors identified as a recurrent reason for our meds errors...’*



World Health  
Organization

Patient Safety

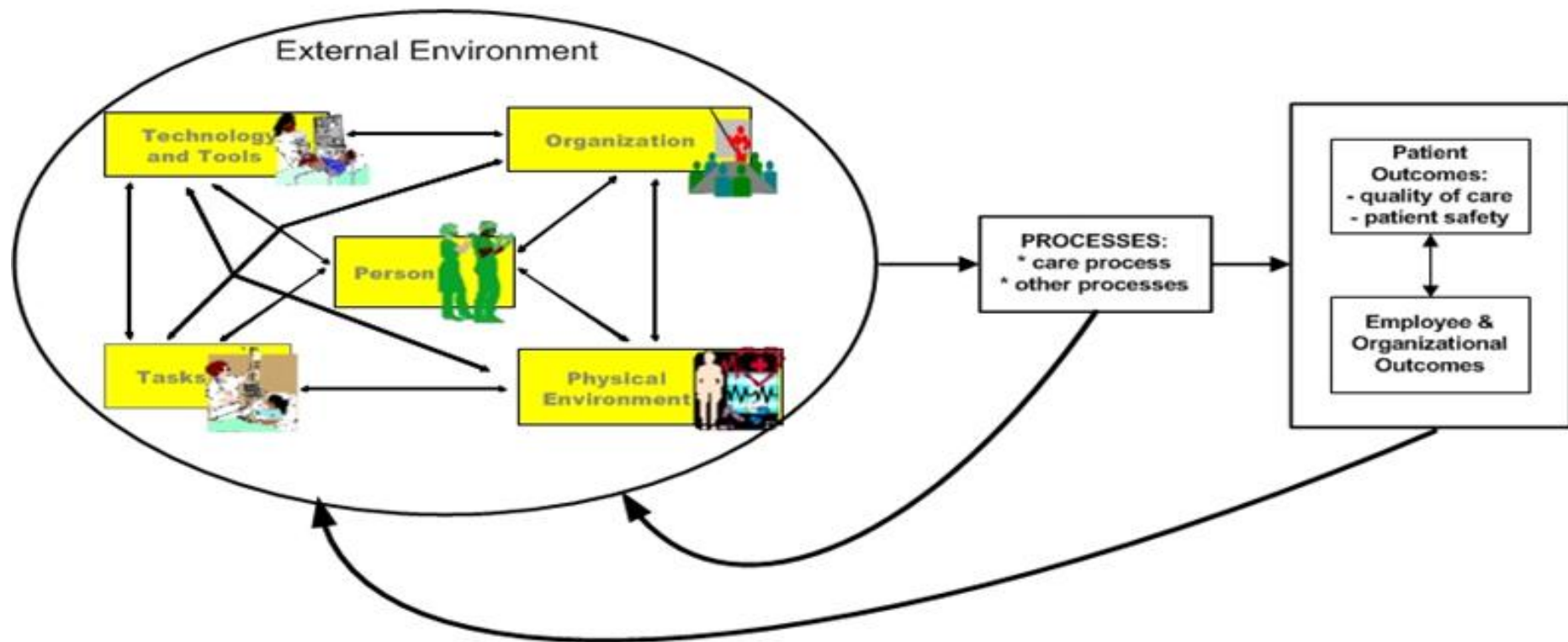
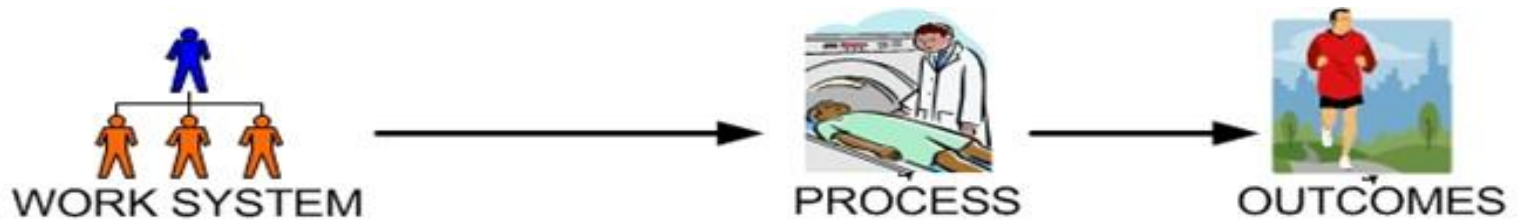
A World Alliance for Safer Health Care

# Patient Safety Curriculum Guide

## Multi-professional Edition

- Lots of positives, but:
  - Conflation of HFE terms/concepts
  - Systems thinking is separate
  - Limited understanding of why things go wrong in complex systems
  - Over reliance on team working, benefits of QI, aviation CRM model
  - Limited recognition that all sections of the guide relate to HFE

# HFE Model for Healthcare – System Engineering Initiative for Patient Safety (SEIPS) Model (Carayon, 2006)



# Tip 1 The Human Factors/Ergonomics Core Concept is to Jointly Optimize System Performance and Human Wellbeing

- **Systems Approach**
  - Complex; Dynamic; Emergence; Poor Design – Work-As-Imagined versus Work-As-Done; Participatory approach
- **WHO Patient Safety Curriculum**
  - Separates Patient Safety from other Organisational systems
  - Describes an Error Reductionist approach (Safety-I and II concepts)



# Tip2 Teaching Faculty Must be Competent to Deliver Theory and Practice (Knowledge & Skills)

- Lack of knowledge and skills - significant challenge
- 2 HFE families of tools could aid curriculum design:
  - Systems modelling (e.g. SEIPS)
  - Task analysis
- Minimum HFE competency is required for application of tools and interpretation of findings

# Tip4

## Recognise what Human Factors / Ergonomics is.....

- HFE is a specific way of thinking and doing
- Systems approach
- Participatory design
- Integration within all levels of organisational systems

# Tip5 .....And Recognise what Human Factors / Ergonomics is NOT

- Not to be confused with Non-Technical Skills, Crew Resource Management, Team Training, Behavioural Interventions etc
- Exclusion of:
  - Systems theory
  - HFE integration
  - Human-centred design principles
  - HFE methods/analysis techniques

# Tip6 Recognise that Human Factors/Ergonomics and Quality Improvement can offer Synergies

- QI has grown in prominence
- Focuses on processes (rather than people)
- HFE focuses on understanding broader systems, complexity and human 'fit', interaction and wellbeing
- Potential for misunderstanding
- Huge benefits in exploring synergies

# Tip7 Curriculum Design and Content Should be Driven by Learning Outcomes to Develop Appropriate HFE Competencies

- HFE professional behaviour is guided by core competencies (IEA, 2001)
- 3 levels suggested for care professions:
  1. Basic HFE theory and practice in workplace
  2. Use of risk management practices in own professional/educational domain
  3. How to access professional guidance for design of systems and interfaces
- HFE outcomes shared across disciplines

# Tip8 Use the Participatory (Co-design) Approach Central to Human Factors to Strengthen Your Specific Curriculum or Programme

- e.g. Explore mismatches between taught curricula and hidden curricula – learners are the experts in the former
- “Learning-As-Imagined [LAI] versus Learning-As-Done [LAD]”

# Tip9

## Recognise that to Err is not Just Human, but is Highly Desirable as part of a Learning Strategy to Develop Transferable Skills in Building Resilient Systems

- Error is normal, not always possible to prevent
- Zero error approach vs complex systems
- Learners need opportunities to ‘fail’ – learn, respond, re-design, test, evaluate
- Paradigm shift for some professions

# Tip10 Build on What is Already There....

- “human factors’ teaching
- ‘Non-Technical Skills’
- QI/Patient Safety training etc
  - Review content with HFE professional/build consensus
  - Close gaps by practically integrating HFE principles



# Tip12 Build Human Factors / Ergonomics Capacity & Capability Creatively

- HFE skills gap worldwide
- Educators trained by HFE experts
- Accredited short courses
- Regional and national strategies to build capacity and capability – academic route
- Opportunity for existing safety and improvement curricula to benefit from HFE integration

# A Human Factors Analysis of GP Training Gaps & Recommendations

HFE Concept	QI and SEA	Reflective log entries	CBD	COT	MSF	PSQ	ESR
Complex sociotechnical Systems	•	•	•				
Human cognition	•	•	•	•			
Work-related stress	•	•					•
Fatigue	•	•					•
Workload	•	•	•				
Decision-making	•	•	•	•		•	
Non-technical skills	•	•	•	•	•	•	
Physical workplace	•	•					
Equipment and technology	•	•	•	•			
Teamwork	•	•	•		•		
Communication	•	•	•	•	•	•	
Work Organisation	•	•					
Safety Culture	•	•	•		•		
Procedures	•	•	•				
Safety, human reliability and risk assessment	•	•	•				
Social and Cultural Pressures	•	•	•				

CBD - Case based discussion; COT - Consultation Observation Tool; MSF - Multi-source feedback; PSQ - patient satisfaction questionnaire; ESR - Educational Supervisor's Report

# Thank You! Any Questions?

[paul.bowie@nes.scot.nhs.uk](mailto:paul.bowie@nes.scot.nhs.uk)

# Workshop Activities

1. Please briefly reflect on and discuss the Learning Canvas and Pharmacy Example in your group
2. Please reflect on the summary guidance 'Tips' (**Prioritise 1, 2, 4, 5, 8, 9, 10**) with your group and explore current gaps in HFE education provision within your healthcare curricula / programmes - use the Learning Canvas to guide you
3. Please highlight potential learning needs of educators around embedding HFE principles in existing curricula/programmes

# Next Steps

- Join the growing HFE Network in Scotland
- Help build consensus on HFE principles and approaches that can be embedded in Healthcare education and practice?
- Contribute to national HFE development and integration work?

[paul.bowie@nes.scot.nhs.uk](mailto:paul.bowie@nes.scot.nhs.uk)