

World Health Professions Regulation Conference 2014

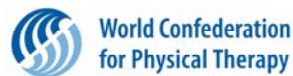
Crowne Plaza Hotel, Geneva, Switzerland

17 & 18 May 2014



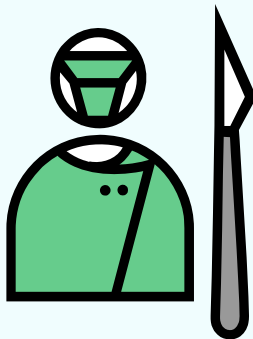
Session 2: Lessons from the evolution of competence based approaches to regulatory function

Keynote: Rhona Flin





Safe in their Hands? Non-Technical Skills and Competence Assessment



Rhona Flin

Industrial Psychology Research Centre
University of Aberdeen

WHPRC, Geneva, 18th May 2014

Dr Harold Shipman family doctor convicted of murdering 215 of his patients



THE SHIPMAN INQUIRY

Chairman: Dame Janet Smith DBE

Independent Public Inquiry into
the issues arising from the
case of Harold Fredrick Shipman

- Dame Janet Smith *Shipman Inquiry 5th Report* (2004)
- *‘consider the approaches taken by industry to maintain and assure professional standards of job performance to meet regulatory standards’*

‘Safe in their Hands?’ competence assessment in high risk industries

- Three ‘high risk’ industries in UK selected
 - Civil aviation
 - Nuclear power generation
 - Offshore oil and gas production
- Report to Department of Health, England – Flin (2005)
‘Safe in their Hands?’
 - Available on www.abdn.ac.uk/iprc

Method

- Semi-structured, face to face interviews
 - Regulators
 - CAA
 - HSE Nuclear Installations Inspectorate
 - HSE Offshore Safety Division
 - Industry
 - Two air operators
 - Two oil companies
 - One nuclear power company

Interview topics

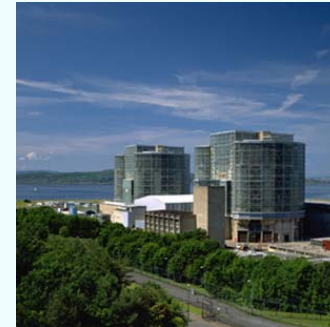
- Identify target group
- Relevant legislation
- Role of the regulator
- Licence checks
- Standards of competence
- Competence assurance systems
- Other performance scrutiny mechanisms/ safety monitoring systems

Civil aviation



- Well established, accepted system
(ICAO 1944)
- Annual licence check by CAA approved examiner
- Six monthly Operational Proficiency Check
- Assesses technical **and non-technical skills**
- Type Rating Examiners have to be qualified as Type Rating Instructors **and as TRIs for Crew Resource Management (non-tech skills)**
- TREs are assessed and revalidated every 3 years by RETREs

Nuclear Power



- Sites are licensed
- Unit Desk Engineers (control room operators), CR Supervisors, Shift Charge Engineers
- ‘Duly Authorised Persons’
- Standards of competence
- Two yearly simulator assessment (tech and non-technical skills) plus interview
- Company appraisal system

Offshore Oil



- Safety case legislation for installations
- Companies' competence assurance systems e.g. for offshore managers
- Defined standards
- Three year assessment of emergency response skills - qualified assessors
- Six monthly appraisal
- Monthly performance reviews/ targets
- Non-technical skills now being introduced

Transfer caveats: industry/ healthcare

High risk industries have:

- Specific organisational cultures
- Strong management hierarchies
- Risk consequences for workers
- Size of target population
 - Much larger in healthcare
- Standard operating procedures

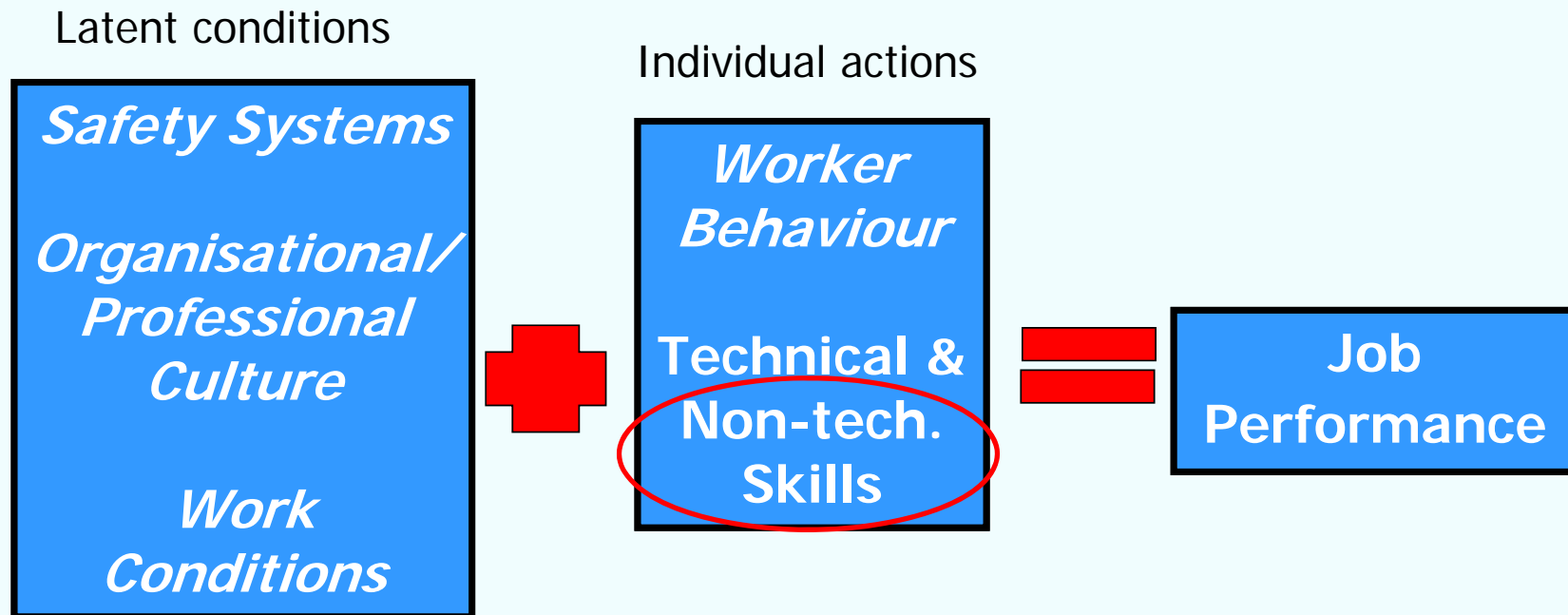
General principles: higher risk industries

- Independent Regulators
- Regular, confirmatory proficiency checks
 - not a default to positive
- Standards of competence
- Trained, accredited assessors
- Non-technical skills
- Management of failure
- Use of simulators
- Physical health checks
- Link competence assurance to safety

Focus on non-technical skills

- Formally trained and assessed in aviation and nuclear industries
- Cognitive and social skills to reduce error/ enhance safety
 - e.g. decision making, situation awareness, team co-ordination, leadership
- Behaviour rating systems eg NOTECHS for pilots
- These have now been introduced for anaesthetists (ANTS), surgeons (NOTSS), emergency physicians, scrub nurses (SPLINTS)

Safe, Efficient Job Performance



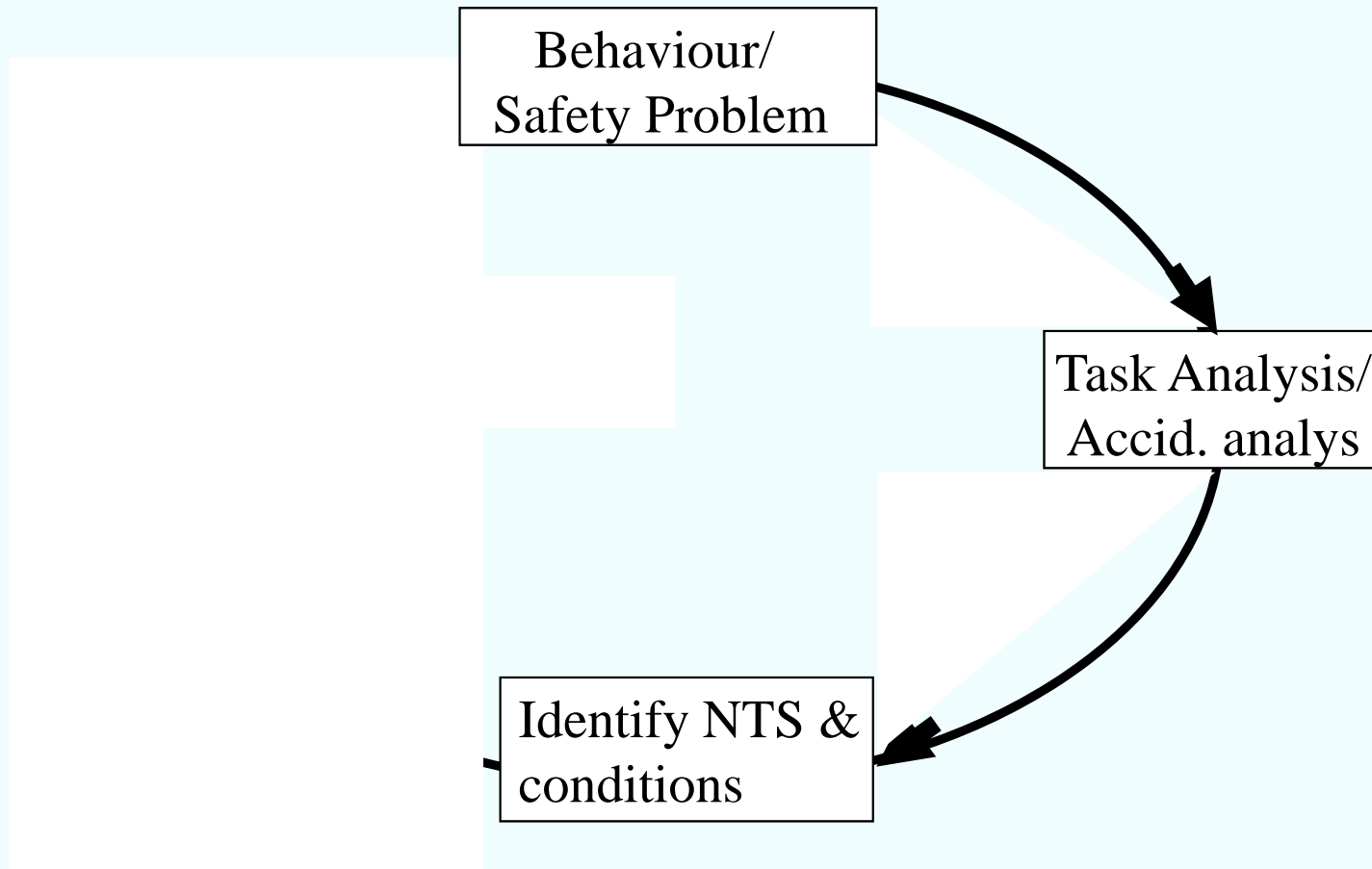
Tenerife accident (1977)



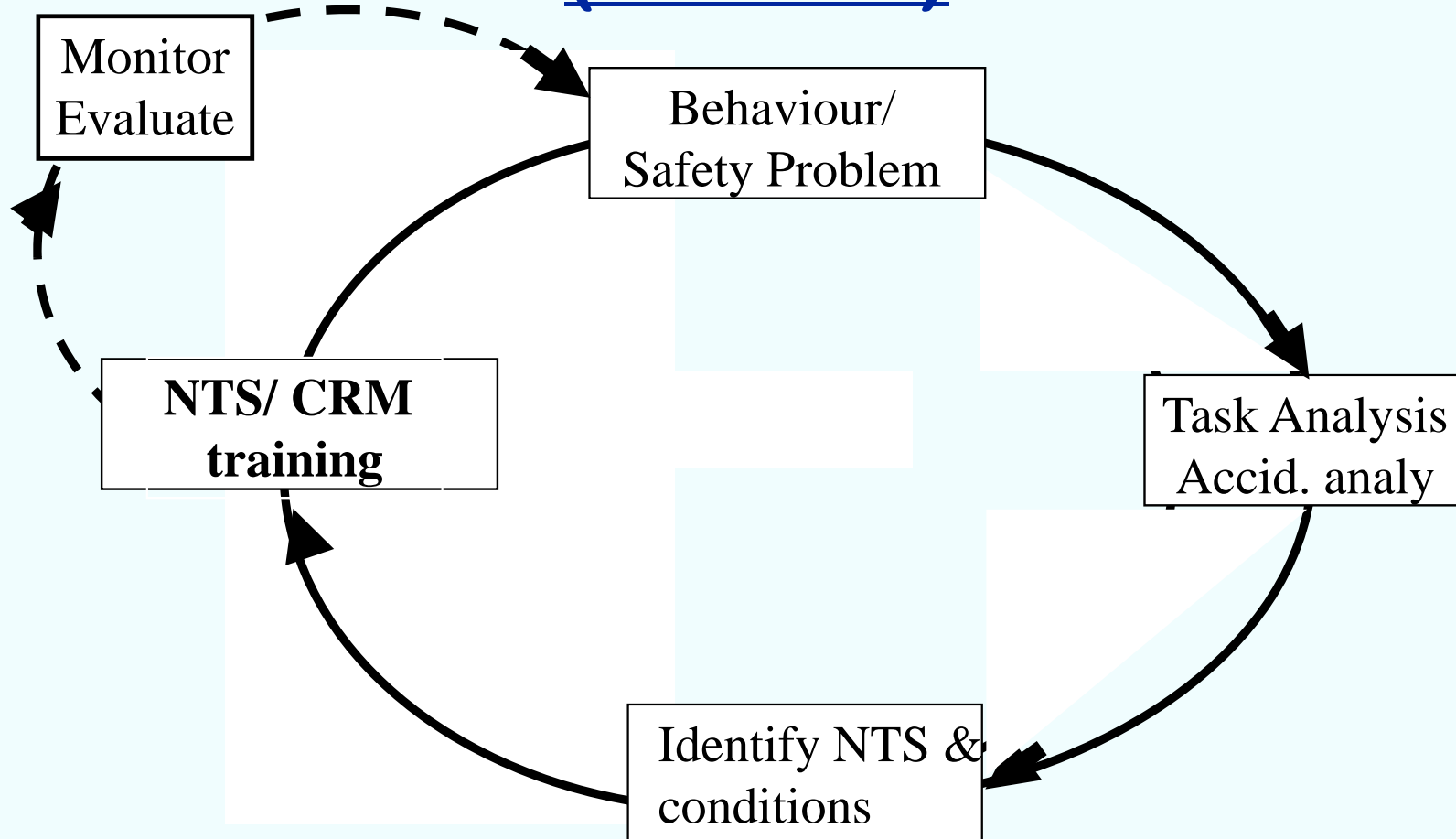
Two Boeing 747s crashed into each other on the runway - 583 people killed

Causes: conflict resolution, assertiveness, communication, situation awareness, stress
i.e. non-technical skills

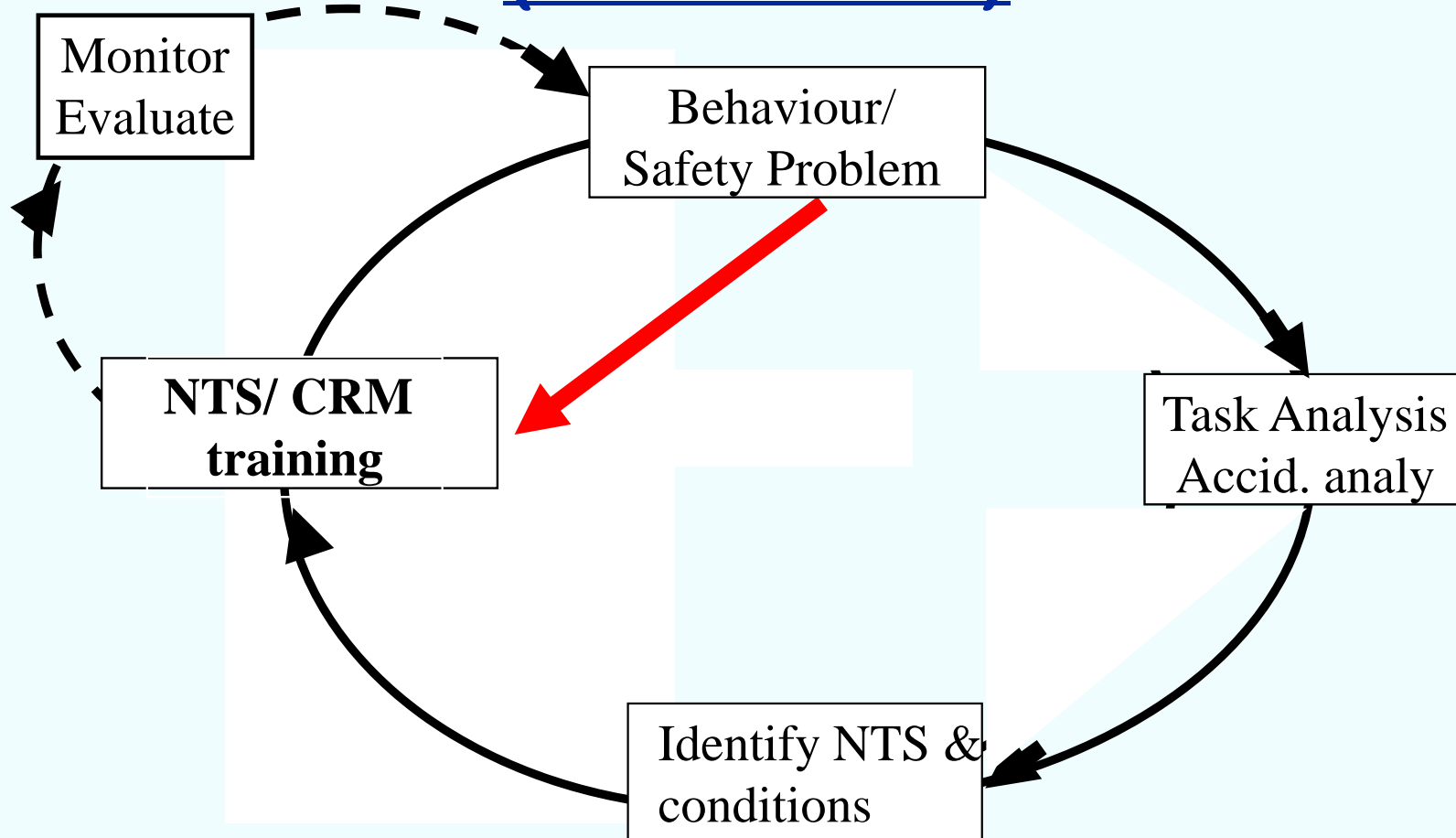
Closing the NTS Loop



Closing the NTS Loop (aviation)



Closing the NTS Loop (healthcare)



Identifying Pilots' Non-Technical Skills



- Task analysis from 1979
 - Flight deck or simulator observations
 - Interviews with pilots
 - Surveys of pilots' attitudes, experiences
 - Confidential safety reporting systems
 - Accident analysis, especially analysis of **cockpit voice recorder**

A 'Black Box' for clinical units? What would be on your voice recorder?

“ ”

.....

“ ”

.....



Voice recorder for your clinical area?

“My way is much quicker....”

“Did she say four..?”

“No-one follows that procedure...”

“I’ve done this hundreds of times..”

“We need to get this case done...”

“I knew that was going to happen...”



Pilots' Non- Technical Skills

- Term non-technical skills first used in European civil aviation (1990s).



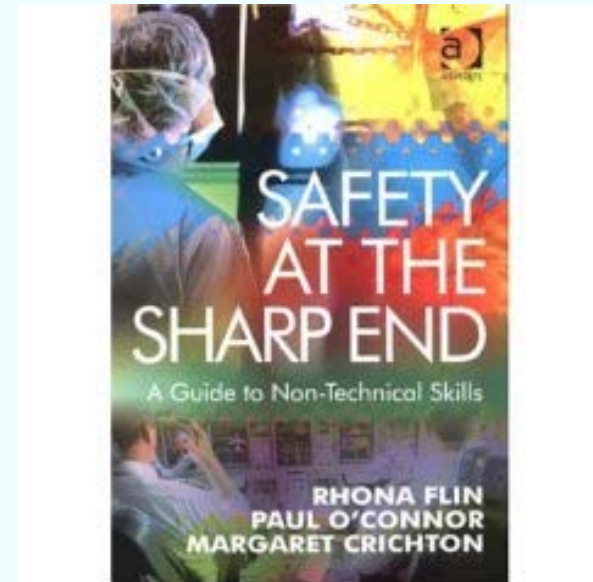
Non-technical skills are the cognitive and social skills that complement technical skills, and contribute to safe and efficient task performance.

Aka: Crew Resource Management (CRM) skills

Formally trained and assessed in aviation and nuclear industries

Non-Technical/ CRM Skills

- Situation Awareness
 - Decision Making
 - Leadership
 - Team Work
-
- Communication
 - Managing stress and fatigue



Crew Resource Management (NTS)

- Based and updated on human factors research identifying behaviours (NTS) critical for safe performance
- 2-3 days basic training (lectures, videos, role-plays, etc.) plus annual recurrent training mandated by CAA (UK)
- Skills practised with feedback in simulator (LOFT)
- Regular formal assessment of non-technical skills for UK pilots mandated by CAA (2004)
- NTS Trainers/ examiners must be assessed as competent

Pilots' Non-Technical Skills

NOTECHS system (1998)

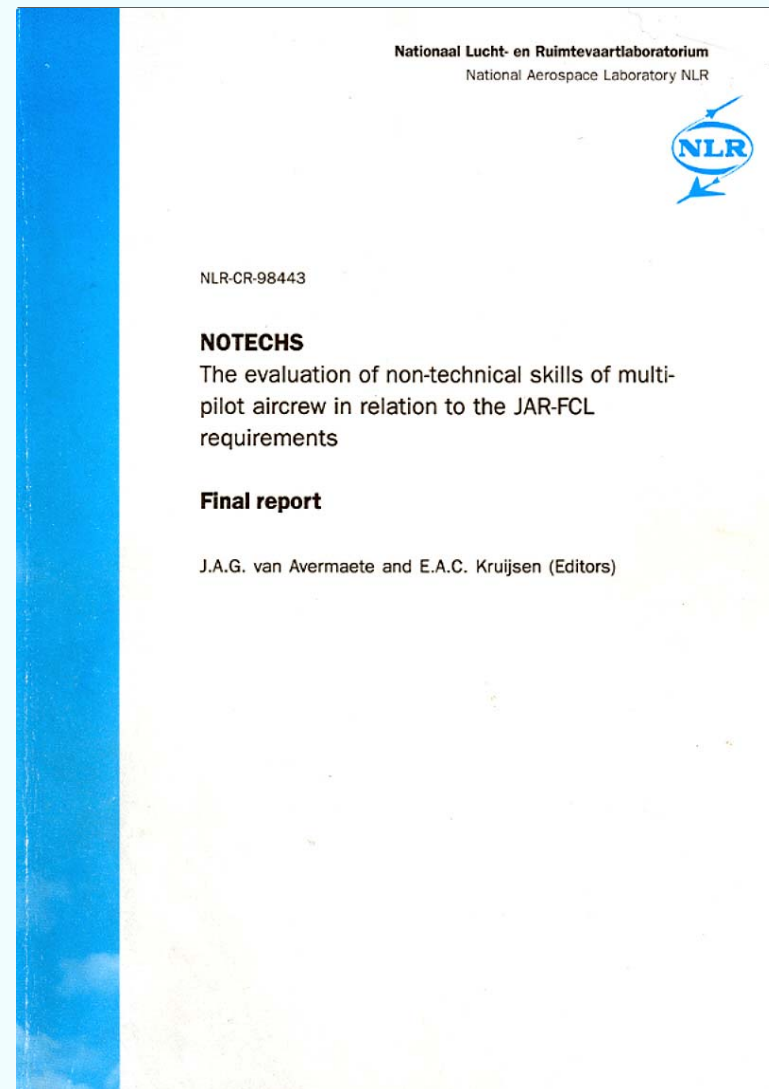
Pan-European

Behaviour rating method to assess a pilot's non-technical (CRM) skills.

Recommended by JAA/ CAA

Adopted by some airlines, adapted by others.

Flin et al (2003) *Human Factors & Aerospace Safety*, 3, 95-117



Relevance for the operating theatre?



Relevance to OR?

Research has shown adverse events in surgery primarily caused by failures of teamwork, judgement:

- Gawande et al (2003; 2004) – insurance claims in the US
- Sevdalis et al (2007) – interruptions in theatre
- Way et al (2003) – 97% of bile duct injuries had perception failures
- Wilson et al (1999) Communication breakdown in 43% of surgical errors

Positive outcomes for the team and patient through good non-technical skills

- Edmondson (2003) – effective leadership
- Healey et al (2004) – observing teamwork in surgery

Non-technical skills for doctors in OR

“The cognitive, social and personal resource skills that complement technical skills and contribute to safe and efficient task performance”

- Communication
- Teamwork
- Leadership
- Situation awareness
- Decision making
- Managing stress and fatigue





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Framework for Observing and Rating Anaesthetists' Non-Technical Skills



**Anaesthetists' Non-Technical Skills
(ANTS) System Handbook v1.0**

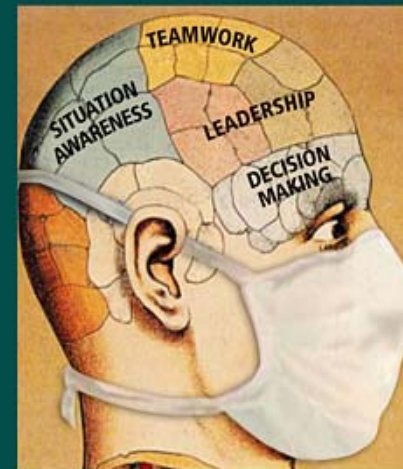


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NHS
Education
for
Scotland

The Non-Technical Skills for Surgeons (NOTSS) System Handbook v1.2



Structuring observation, rating and feedback of
surgeons' behaviours in the operating theatre

SPLINTS development method

Task analysis (2008-2009)

- Literature, survey, observations, interviews: nurses and surgeons
- List of skills emerged

Taxonomy design and development (2010)

- Skills sorted by panels of nurses
- Taxonomy and behavior markers written

Evaluation (2011)

- Reliability - using video scenarios (n= nurses)
- Usability testing in theatre

Implementation (2012 -)

- SPLINTS debriefing in theatre and theatre simulators
- Develop SPLINTS curriculum

Method – task analysis

- Review of literature n=13 papers
- Observations n=24;
- Interview: nurses n=25; 3 hospitals
mean experience 15yr; SD 9.38; range 2-33yr
consultant surgeons n=9; 4 hospitals

Mitchell, L. & Flin, R. (2008) *Journal of Advanced Nursing*, 63, 15-24

Nurses' interview data

“ You just know when something is going wrong, it’s either... you can physically see that something’s happened but sometimes you can’t see. You can just recognise the surgeon’s body language or see them clenching their jaw .. that things are not going well.”

“...when they [surgeons] ask for something and you give them what you think it is that they need and it’s not the thing they said but you know it is what they actually want.”

“The surgeon said “give me the buzzy thing.. ”

Surgeons' interview data

- if I'm really concentrating hard on a task I'll forget the names of instruments I use every day
- a lot of what you need arrives in your hand without you actually having got as far as asking for it, it's almost telepathy, it's smooth, it runs
- they [scrub nurses] need to have the ability to be quite focused on the procedure and not be distracted by what else is going on

Coding Interview Transcripts

How do you keep track of the status of an operation?

You know by the surgeon's voice, by his actions. Just by what he asks for, you know if he's come upon things he's not expecting(1). You have a procedure you follow and there are certain things you expect to happen(2) so you just go on and you go on and then when something isn't right, you know it isn't right because, if you can't see, which often you can't, he'll ask for something you're not expecting(3). At that point he usually says something to his assistant or to the anaesthetist(4) so you just gauge it. Or perhaps it's the anaesthetist who has recognised something on the monitor, and you can hear it sometimes, different to the way it should be(5). It depends on the experience of the surgeon too, because if you have an inexperienced surgeon when things like that change they'll maybe get a bit hot under the collar and you've got to be the one to keep it calm(6). The junior surgeons do look to you(7), mostly although some of them can get a bit stroppy in his voice and in his manner, those who want to remain in charge and you think, right, things aren't going to plan here. But most of them will say something like, "what do they normally use here?" or "what does Mr X use here?" so they look to you to tell them that(8). So, that's when you know that it's not going clockwork.(9)

Cognitive skills e.g. situation awareness, decision making

Social/ Interpersonal skills e.g. communication, teamwork, leadership

Task Management skills e.g. planning and preparation, prioritising

Stress/Fatigue management skills

Emerging skill set....

Literature review

communication, teamwork, situation awareness

No leadership or decision making

Interviews (25 nurses, 9 consultant surgeons)

**communication, teamwork, situation awareness,
task management, coping with stress**

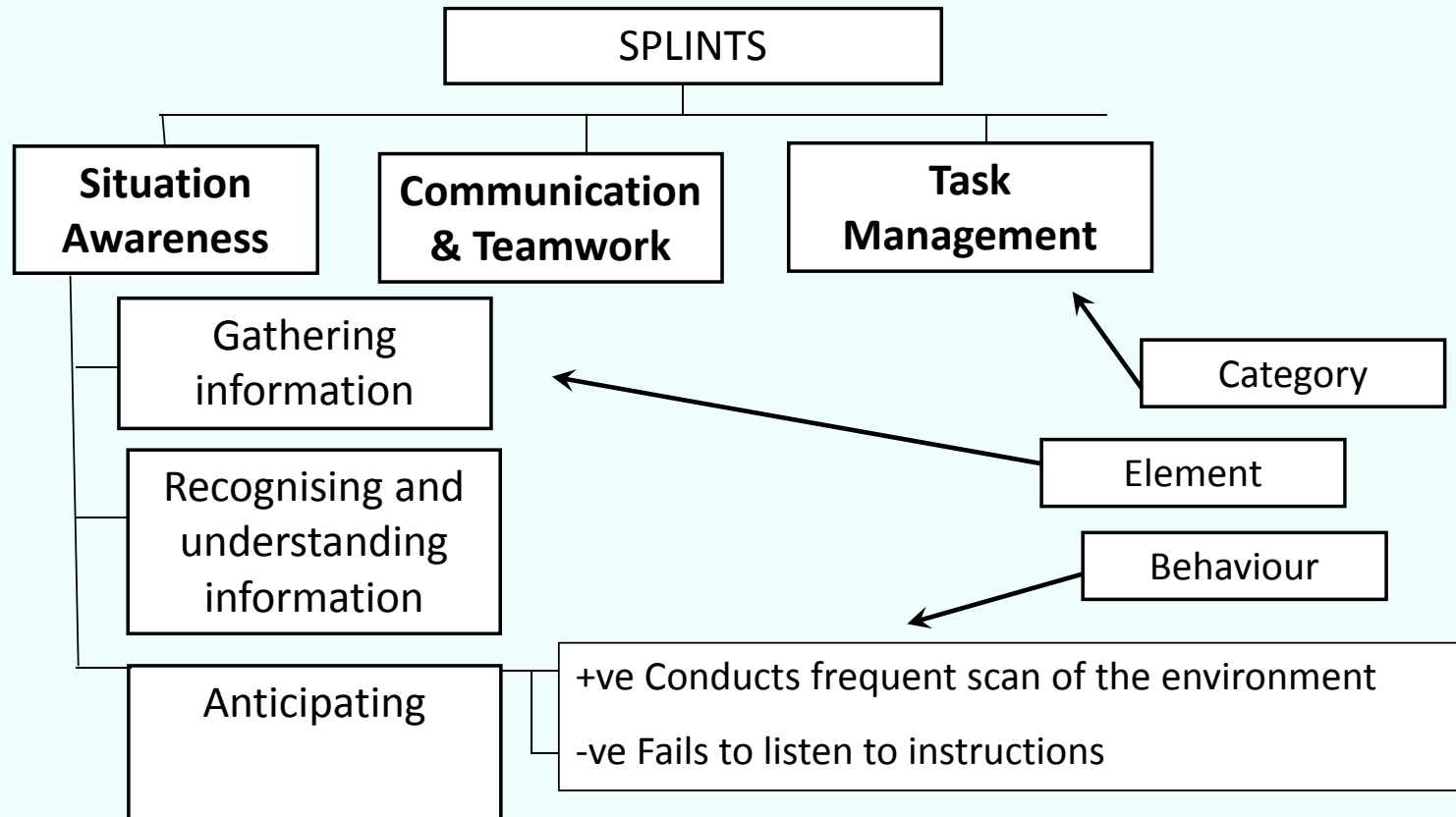
Less: leadership, decision making, managing fatigue

Developing the SPLINTS framework

Mitchell, Flin et al (2013)

- Panels of experienced theatre nurses n=4;
from 3 Scottish hospitals
- Reduced original list from 7 categories containing 27 elements
to 3 categories with 9 elements
- Taxonomy guidelines followed;
 - observable behaviours
 - generic to all surgical specialities
 - simple structure; easy to use in theatre
- Provided labels/ examples of good and poor observable
behaviours to describe those skills

The SPLINTS framework



SPLINTS taxonomy

<i>Category</i>	<i>Element</i>
Situation Awareness	<ul style="list-style-type: none">•Gathering information•Recognising and understanding•Anticipating
Teamwork and Communication	<ul style="list-style-type: none">•Acting assertively•Exchanging information•Co-ordinating with others
Task Management	<ul style="list-style-type: none">•Planning and preparing•Providing and maintaining standards•Coping with pressure

SPLINTS rating form v1.0

Hospital Trainer Name Date

Junior Name Operation

Category	Category rating*	Element	Element rating*	Feedback on performance and debriefing notes
Situation Awareness		Gathering information		
		Recognising and understanding information		
		Anticipating		
Communication and Teamwork		Acting assertively		
		Exchanging information		
		Co-ordinating with others		
Task Management		Planning and preparation		
		Providing and maintaining standards		
		Coping with pressure		

* 1 Poor; 2 Marginal; 3 Acceptable; 4 Good; N/A Not Applicable

- 1 Poor Performance endangered or potentially endangered patient safety, serious remediation is required
- 2 Marginal Performance indicated cause for concern, considerable improvement is needed
- 3 Acceptable Performance was of a satisfactory standard but could be improved
- 4 Good Performance was of a consistently high standard, enhancing patient safety; it could be used as a positive example for others
- N/A Not Applicable

Task analysis

Systematic review of nursing and psychology literature Mitchell & Flin (2008) *Journal of Advanced Nursing*, 63, 15-24
Unstructured observations of scrub nurses on task

Study 1 - Interview study

Mitchell, Flin, Yule et al (2012) *International Journal of Nursing Studies*
Semi-structured interviews with scrub nurses & surgeons
Analyses of interview data to extract non-technical skills for scrub nurses

Study 2 - Develop the non-technical skills taxonomy

Panels of expert theatre nurses discuss and refine skills taxonomy
Preliminary skill set produced with examples of poor and good observable behaviours for the identified skills

Study 3 – Reliability testing of rating system

Record simulated scenarios showing scrub nurse behaviours
Nurse experts rate nurse behaviours displayed in scenarios to test reliability and psychometric properties of rating system

Testing the SPLINTS scale

- Record simulated scenarios to test prototype SPLINTS rating system



SPLINTS reliability Study 3

Method

Full day sessions; n=7

Scottish teaching hospitals; n=5

Experienced scrub practitioners; n=34

Basic human factors training including introduction to non-technical skills

Detailed input on SPLINTS taxonomy including definitions and behavioural markers to guide ratings of good and poor performance

Inter-rater agreement (r_{wg}) Element level

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Mean
1. SA								
Element 1	0.7	0.75	0.53	0.88	0.85	0.46	0.67	0.69
Element 2	0.7	0.78	0.51	0.91	0.88	0.48	0.7	0.71
Element 3	0.69	0.8	0.64	1	1	0.41	0.59	0.73
2. C&TW								
Element 1	0.7	0.73	0.61	0.91	0.82	0.5	0.65	0.7
Element 2	0.66	0.75	0.6	0.88	0.84	0.58	0.69	0.71
Element 3	0.72	0.76	0.51	0.91	0.86	0.46	0.65	0.7
3. TM								
Element 1	0.64	0.79	0.53	0.91	0.91	0.49	0.6	0.7
Element 2	0.64	0.74	0.55	0.85	0.83	0.51	0.5	0.66
Element 3	0.64	0.75	0.39	0.82	0.73	0.58	0.67	0.65
Scenario Mean	0.68	0.76	0.54	0.9	0.86	0.5	0.64	

Test results

- Acceptable ratings
- Better agreement at the category than element level
- Scenario differences
 - Nurses generally positive about the system
 - Need training to use system

Non-technical skills of the operating theatre scrub nurse: literature review

Lucy Mitchell & Rhona Flin

Accepted for publication 18 March 2008

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Lucy Mitchell MA MSc Research Assistant School of Psychology, University of Aberdeen, Aberdeen, UK

Rhona Flin BSc PhD CPsychol Professor of Applied Psychology

MITCHELL, L. & FLIN, R. (2008) Non-technical skills of the operating theatre scrub nurse: literature review. *Journal of Evaluation in Clinical Practice* 14 (2), 217–223

Abstract
Title: Non-technical skills of the operating theatre scrub nurse. This paper is a review to social skills used by scrub nurses.
Background: Recognition that failures in

Journal of Evaluation in Clinical Practice
International Journal of Public Health Policy and Health Services Research
Journal of Eval

Development of a behavioural marker system for scrub practitioners' non-technical skills (SPLINTS)
Lucy Mitchell MA MRes,¹ Rhona Flin BSc PhD CPsychol FBP&S FRSI Steven Yule BSc MSc PhD,^{2*} Janet Mitchell RGN DipN MScN,³ Kathy Co George Youngson CBE MBChB PhD FRCPe FRCSed⁴

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Keywords
marker system, non-technical skill, scrub nurse, scrub practitioner, SPLINTS

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Accepted for publication: 22 December 2011

doi:10.1111/j.1365-2702.2012.01825.x

Introduction

The operating theatre is a high-risk environment where multidisciplinary teams are required to work together towards a common goal: the safe surgery of the patient (see [1]). Research has suggested that adverse events occur in over 10% of patients admitted to hospital [2] despite ongoing efforts to reduce this since 'To Err is Human' was published [3]. Adverse events are unintended injuries or complications caused by the management of the patient's care rather than the underlying medical condition [4] and a systematic review of adverse event studies suggested that

41% of all hospital adverse events [5]. One important element of the scrub nurse team is the scrub nurse, operating department responsibilities including counts are carried out as a consequence of the surgical and other foreign objects [6] despite technical staff

A study of medical records on scrub nurses working in the theatre



Evaluation of the Scrub Practitioners' List of Intraoperative Skills (SPLINTS) system

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Assessment
Non-technical skill
Operating theatre
Name
Scrub nurse
Scrub practitioner

ABSTRACT

Background: The Scrub Practitioner's List of Intraoperative Skills (SPLINTS) is a new tool for training and assessing scrub practitioner behaviours during surgical operations.
Objective: The aim of this study was to test the psychometric properties of the prototype SPLINTS behavioural rating system.
Method: Experienced scrub practitioners (n = 14) undertook a 6-month background training in human factors and non-technical skills to use the SPLINTS system. They then used SPLINTS to rate non-technical skill performance in seven standardized simulation scenarios.
Results: Reliability, measured by within-group agreement (Cohen's kappa) and six out of nine elements, was acceptable (0.70) within one scale point of expert ratings (>90% of skill ratings use SPLINTS to score performance with a reasonable level of internal consistency of the system; absolute mean difference for all three categories). Participants were aware of and understood the system and usable as an assessment tool.
Conclusion: The reliability of the SPLINTS system was deemed to be suitable for use in the operating theatre.

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What is already known about the topic?

- Non-technical (cognitive and social) skills are an essential element of safe and efficient task performance for staff working in the operating theatre.
- Previous research has identified taxonomies of non-technical skills for surgeons, anaesthetists and scrub practitioners.
- Behavioural rating systems can provide a structured method for training and rating non-technical skills.

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doi:10.1016/j.ijnurstu.2011.08.002

What this paper adds

- The SPLINTS system provides a structured method for discussing non-technical skills that are effective performance during surgery.
- Even with minimal training, scrub nurses can use the SPLINTS behavioural rating system to rate the non-technical skills of scrub practitioners seen in simulation scenarios.
- Empirical evidence gathered from experts that the prototype SPLINTS system is complete and usable.

SPLINTS Papers



Thinking ahead of the surgeon. An interview study to identify scrub nurses' non-technical skills

Lucy Mitchell¹*, Rhona Flin², Steven Yule³, Janet Mitchell⁴, Kathy Coutts⁵, George Youngson⁶

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²Aberdeen Royal Infirmary, UK
³Royal Aberdeen Children's Hospital, UK

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Keywords:
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Non-technical skill
Operating theatre
Practitioner
Scrub nurse
Teamwork

ABSTRACT

Background: Efforts to reduce adverse event rates in healthcare have revealed the importance of identifying the essential (non-technical (cognitive and social) skills for safe and effective performance. Previous research on non-technical skills for operating theatre staff has concentrated on doctors rather than nursing professionals.
Objective: The aim of the study was to identify the critical non-technical skills that are essential for safe and effective performance as an operating theatre scrub nurse.
Methods: Experienced scrub nurses (n = 25) and consultant surgeons (n = 9) from four Scottish hospitals were interviewed using a semi-structured format. The protocols were designed to identify the main social and cognitive skills required by scrub nurses. Interviews were digitally recorded, transcribed verbatim and independently coded to extract behaviours in order to produce a list of the main non-technical skills for safe and effective scrub nurse performance.
Results: The non-technical skills of situation awareness, communication, teamwork, task management and coping with stress were identified as key to successful scrub nurse task performance. Component sets of behaviours for each of these categories were also noted.
Conclusion: The interviews with subject matter experts from scrub nursing and surgery produced preliminary evidence that situation awareness, communication, teamwork and coping with stress are the principal non-technical skills required for effective performance as a scrub nurse.

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What is already known about the topic?

- Research with anaesthetists and surgeons has identified sets of non-technical (cognitive and social) skills for safe and efficient task performance in the operating theatre.
- There is some evidence that scrub nurses require similar skills but these have not been formally identified.

What this paper adds

- Interviews with scrub nurses and surgeons identified situation awareness, communication, teamwork, task management and managing stress as important non-technical skills for scrub nurses.
- Identification of the key non-technical skills is the first step towards the development of a behavioural rating system for structured training and assessment of scrub nurses' non-technical skills.

1. Introduction

Every 36th an estimated one million people use the UK National Health Service and, although the majority receive

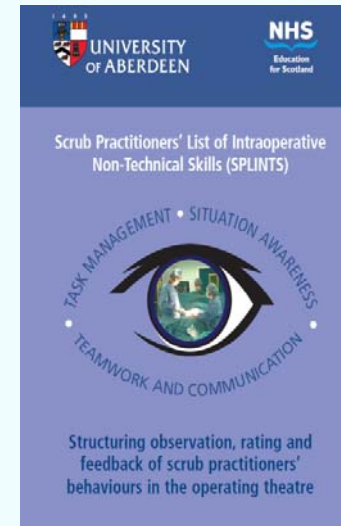
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SPLINTS interest

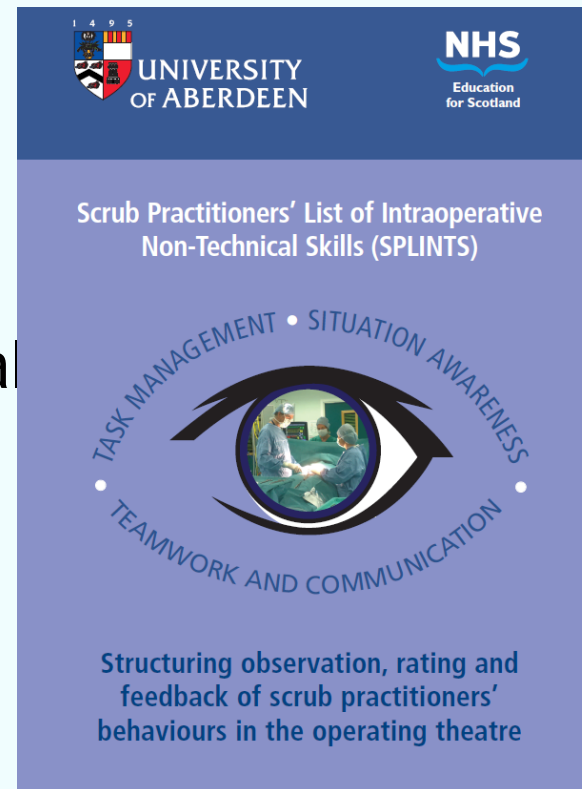
www.abdn.ac.uk/iprc/splints

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- Switzerland
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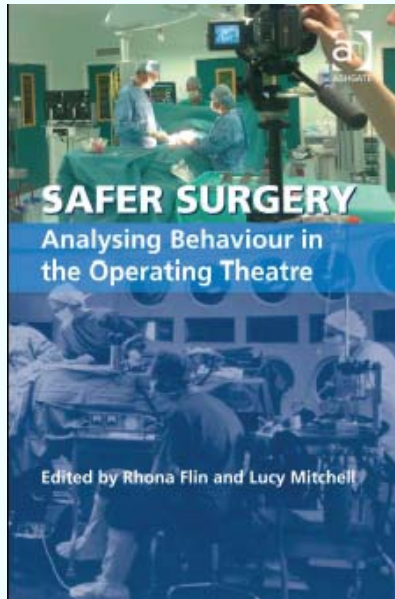


Uses for SPLINTS

- Provides a common language/terminology for discussing non-technical skills/ issues
- Assist training and assessment of non-technical skills in junior scrub staff
- A structured framework to identify/ rectify ongoing training needs



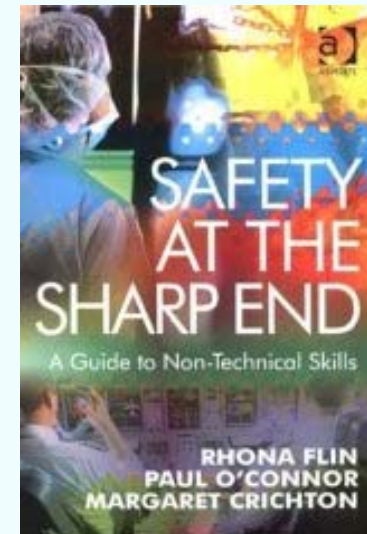
Further reading on NTS



Flin & Mitchell (Eds) (2009)

Farnham: Ashgate

Flin, O'Connor & Crichton (2008),
Aldershot: Ashgate



Professional issues

- Ab initio education of NTS concepts
 - *Cf Human Performance Limitations for Pilots*
- Training NTS
 - Qualification of NTS trainers
 - Single discipline before multi-discipline?
- Competence assessment
 - Qualification of NTS assessors
 - *Cf CRM instructors/ examiners in aviation*

The Industrial Psychology Research Centre University of Aberdeen

Further information

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- www.abdn.ac.uk/iprc

lists of projects and papers and reports