Resilience Markers Framework:
Identifying resilience strategies at the individual and team level

Dominic Furniss & Jonathan Back


Workplaces in Intensive Care Units

B. Braun Space is the best laid-out, most reliable solution for (complex) intensive care medicine, which allows itself to be matched to patient needs. That's how modern intensive care workplaces are built.

Complete medicinal therapy at a glance

ICU beds equipped with the Space Generation are attractive due to their clarity. The central-level status and alarm display, the SpaceCover, helps minimize reaction times. All device displays are stacked one on top of each other, so that even complex medications can be understood at a glance. The medication name and dosage are immediately legible, even from the foot of the bed. That added clarity increases safety and minimizes reaction times in critical situations.

One organizational system covers the complete spectrum

Thanks to the universal applicability of Space pumps, for instance as feeding pumps or PCA pain pumps, additional specialized pumps are no longer needed outside the organizational system.

Easy expandability

The Space Generation is capable of keeping up with the increasing complexity of modern intensive care. Workplaces can be expanded to 8, 12, or even more pumps for ARDS or MODS patients, for instance, in just a few steps.

Your benefits

- Complete medicinal therapy at a glance
- One organizational system covers the complete spectrum
- Easy expandability
- Space saving tidy solution
- Plug-and-Play IT/PDMS integration
Rough Structure

• 15mins Introduction to resilience strategies

• 30mins Group exercises

• 20mins Group feedback and discussion

• 20mins Introduction to RMF
The Problem

• What does resilience look like? What resilience things do individuals and teams do that can be considered resilient?

• Can we identify concrete examples?

• How do we talk about these examples?
Learning Objectives

• Start to think about developing a vocabulary for talking about resilience strategies within and across domains

• Understand the RMF as a way of describing and accounting for the sorts of things which impact the use of different resilience strategies in context
Human Error

“To err is human...”

www.errordiary.org
New error from @falkowata

855. I knew that sooner or later this would happen: I’ve added grapes to hummus instead of olives. #errordiary

Tweet by @falkowata. Appeared on #errordiary via twitter on Feb 27, 2012.
🌟 Favourite

New error from @dkontaris

829. Metropolitan police send 1,000 victims each other’s email addresses http://t.co/Rt0A7wW0 #errordiary

Tweet by @dkontaris. Appeared on #errordiary via twitter on Feb 2, 2012.
🌟 Favourite

New error from @schrodingerstkit

869. Chemistry student killed in exploding bubblegum misadventure http://t.co/ SQVWU8Pr #errordiary writ large!

Tweet by @schrodingerstkit. Appeared on #errordiary via twitter on Mar 4, 2012.
🌟 Favourite
Resilience Strategies: RSDiary
“To err is human... but the proactive avoidance of error is human too!”
New resilience strategy from @oopsohno

725 Keep forgetting to use Boots gift card. Put it next to Boots Advantage card in purse so I’ll remember now. Hopefully. #rsdiary

Tweet by @oopsohno. Appeared on #rsdiary via twitter on Dec 5, 2011.

New resilience strategy from @drannalcox

682 @RS_Diary you can buy bracelets that you swap from arm to arm to remind you which side to breast feed your baby from next #rsdiary

Tweet by @drannalcox. Appeared on #rsdiary via twitter on Nov 11, 2011.

🌟 Favourite
New resilience strategy from @rs_diary

Thinking of putting plastic bag in washing basket to separate new ‘wash cold’ jumpers early in process #rsdiary

Tweet by @rs_diary. Appeared on #errordiary via twitter on Nov 1, 2011.
🌟 Favourite

Comments:
1. elaine on November 15, 2011 at 17:16 said:
I am definitely going to use this – great idea!

Reply ↓
Exercise

• Get into groups
• Collect a pack of tweets, or use www.errordiary.org
• Try to see if you can group them into general categories of resilience strategies or patterns of behaviour?
• Present findings and reflections back to the group
www.errordiary.org
Cognitive Resilience: Can we use Twitter to make strategies more tangible?

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Method

• We categorised the 49 tweets
• 7 types of resilience strategy emerged
• We defined each type of resilience strategy
• We recruited 6 respondents to categorise the 49 tweets into the 7 categories and ran interrater reliability tests
Seven Categories

1. Cue creation to support prospective memory
2. Pre-mature completion awareness
3. Pre-emptive Separation & Disambiguation
4. Pre-commitment Check
5. Managing Resource Availability
6. Routine Adjustment
7. Reinforcement
Interrater Reliability

- 6 respondents asked to categorise 49 tweets into the 7 categories to see similarity
- Interrater reliability for raters Kappa = 0.48
  0.40-0.59 moderate;
  0.60-0.79 substantial;
  0.80+ outstanding
Limitations

• Tweets are limited to 140 characters
• Only 5 unique contributors, 83% from me
• But 63% of my tweets were observations of others

• Website redesign: [www.errordiary.org](http://www.errordiary.org)
• Need to publicise and incentivise contributions
What have we learnt?

• **Content**: We have started to develop a vocabulary for making abstract resilience strategies more tangible e.g. disambiguation strategies

• **Process**: Proof of concept
  – data could be larger and better
  – this needs to be triangulated with other sources e.g. observational studies
The Resilience Markers Framework (RMF)
A focus on resilience strategies

- What strategies can we observe?
- Is there a method that can help us?

During a recent interview, a nurse reported that she reprograms pumps that are delivering IV fluids at midnight.

This resets the volume infused counter enabling the total daily volume to be easily calculated.

going beyond design basis
A focus on resilience strategies

- This work is important because resilience is poorly documented.
- When new systems are introduced old resilience strategies may be lost.
- Understanding how strategies evolve over time and across domains requires a consistent way of documenting resilience.
Strategies are needed to maintain effective task performance and/or mitigate error. They can be performed when anticipating an error or a threat to effective performance.

**RMF**

- **Strategy Level**: Hard to identify without a method.
- **Observational Level**: Hard to generalise to other contexts.
RMF

Create a new indicator

Changing alarm system parameters so when the alarms go off they provide more useful information about change.
(Mumaw et al. 2000) - Nuclear
RMF

**Horizontal traceability**
- Between domains

Create a new indicator

Changing alarm system parameters so when the alarms go off they provide more useful information about change. (Randell, 2004) – Hospital
Resilience Strategies can involve:

- Creating Cues and Artifacts to Support Prospective Tasks
- Changing Routines and Procedures
- Using Cognitive Artifacts
- Using Other People
- Separation & Disambiguation
- Reinforcing an Existing Safety barrier
- Checking before committing to an action, or after an action is completed
- Managing the availability of resources
- Managing attention and workload by creating adhoc cues and artifacts
- Appropriation
- Substitution
- Managing complexity by adapting routines (short term or long term)
RMF

- Resilience repertoire
- Strategy Level
- Observational Level
RMF

Strategy Level

Resilience repertoire

Mode of operation

Resources & enabling conditions

Vulnerabilities & Opportunities

Observational Level
Summary

• Horizontal traceability

• Four elements expands strategy level: repertoire, mode of operation, enabling conditions, and vulnerability or opportunity
<table>
<thead>
<tr>
<th>Creating Cues and Artifacts to Support Prospective Tasks</th>
<th>Using cues and reminders.</th>
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<tbody>
<tr>
<td>Separation &amp; Disambiguation</td>
<td>Separating or marking items to avoid confusion and differentiate them; findability.</td>
</tr>
<tr>
<td>Reinforcing an Existing Safety barrier</td>
<td>Taking initiative to reinforce a safety barrier, taking safety precautions.</td>
</tr>
<tr>
<td>Checking before committing to an action, or after an action is completed</td>
<td>Ensuring all elements needed for a task are present or have been completed.</td>
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<tr>
<td>Managing the availability of resources</td>
<td>Ensuring the resources are available when the task needs to be done, even if initially forgotten.</td>
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<td>Creative / innovative use of a resource to overcome a vulnerability.</td>
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<td>Replace an existing tool that is not available</td>
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<td>Place markers, lists, and other representational artifacts to support cognition in task.</td>
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<td>Anticipating difficulties and adjusting the routine accordingly.</td>
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