

Organizing for High Reliability: The Role of Reflective Practice

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HS776 Prof Rudolph

Tasting menu

Brief over view of some central organizational concepts

Emphasis on the social psychology of organizing for High Reliability

Reflective practice: how to do research on our own contributions to reliability or goals we care about

High-performing captains: If you have questions or am not making sense as you see the world, bring it up

Interruptions: Moderate level of interruptions improves performance...so please feel free to ask questions

Confidentiality and what you share about your case and your thoughts on it is up to you.

Schedule

- Brief introductions 2:00-2:30
- Organizing for High Reliability 2:30-3:15
 - Reflective practice as source of resilience
- Case Analysis Introduction 3:15-3:30
- BREAK 3:30-3:45
- Case Analysis 3:45-4:45
- Summing up: What are the “Take-Aways?”
 - 4:45-5:00

Introductions—

- Your name
- Your affiliation
- A question or comment regarding “collaborative off-line reflection” article

OR

- Something you would like to improve in your own way of interacting related to your case?



Organizing for High Reliability

General concepts

- Complexity and Tight Coupling: Perrow
- Hazards, defenses, losses: Reason
- [Reason's Swiss cheese model](#)

Some applications

- Learning from accident and error in
 - Nuclear Power—Chernobyl
 - Jurassic Park
 - Chemical Processing—\$16M explosion
 - Medicine—coming up

The Quality of "Soft" Defenses

- Threat-Rigidity Responses (Staw et al.)
 - Restriction in info processing
 - Regression to well-learned responses
- Automatic problem-solving responses
 - Nuclear power—"coal" mentality
 - Aviation—"command and control"
- Organizational bases
 - Socialization, professional training

"Reflective Practice" as a source of Resilience

- Donald Schon's Reflective [Practitioner](#)
- "Frames" and Inferences
 - Tacit assumptions ("frames") guide behavior
 - Frames definition
 - If-then rules; pre-existing beliefs
 - Inferences = conclusions we draw based on data
 - We are unaware of these assumptions, or "frames"
 - Brief case example
- Applications
 - Reflective practice work groups
 - High fidelity simulation
 - Action Research

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Show Schon book

Show Torbert book for reflective practice work-groups

Show Action Science Journal

Diagnostic Error and Ingenuity in Operating Room Crises

Research Funded by the
National Patient Safety Foundation and
US Dept. of Veterans Affairs



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Find out who's here...introductions.

COLMR

Interruptions...you can influence my performance positively...

Blind to my own assumptions, so if something I'm asserting doesn't make sense, please ask me about it...

Your input on how to clarify or improve the presentation of these data is very welcome...jot notes I'd be very grateful to have them, terms etc.

Study Goals

- Describe automatic problem solving responses in a medical crisis

Research Question:

- What are the characteristics and consequences of different problem solving modes involving diagnosis?

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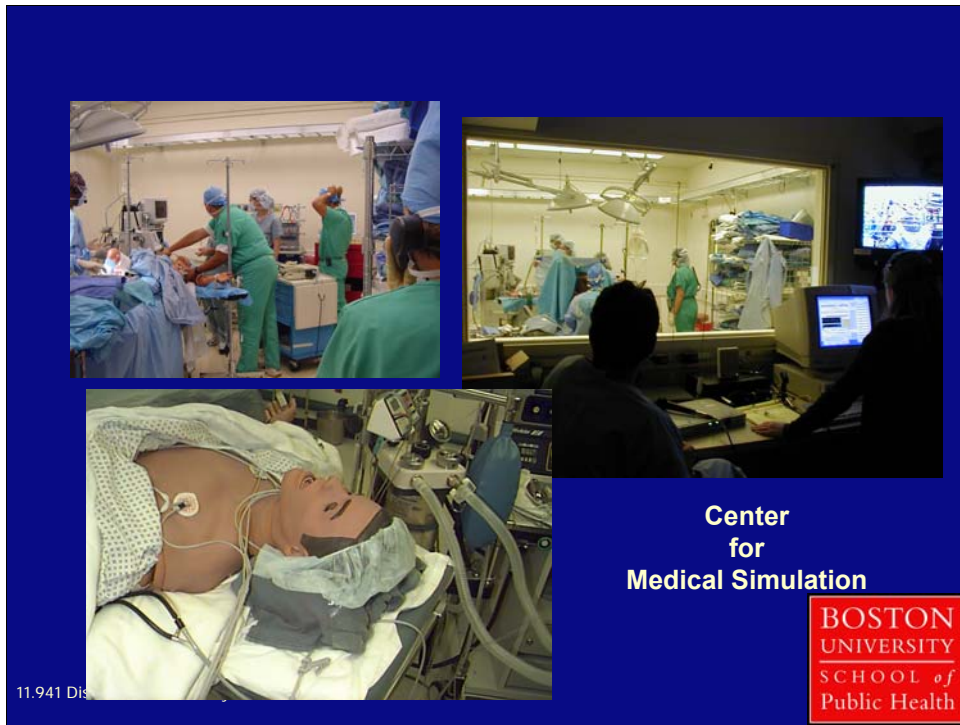


Base-line:

Document where we are so can design training programs; get a bead on what is being deeply ingrained in medical education

How do these interact? Inhibit or facilitate each other? Issues of timing?

RQ: Novel plus quantity, not just solve the fix the oxygen failure (known problem, tight time pressure); not just a confusing or unknown presentation of symptoms, but both.



CMS—at forefront, 900 clinicians yearly

Fully outfitted OR

Methods short shrift

Data Sources

- Videos and transcripts
- Post-simulation debriefing summaries
- N = 39



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20-page protocols: time scale, words, deeds, vital signs

Debriefing: What they were thinking and feeling that led them to take the actions they did

Data Analysis

- **Process Tracing** (Woods, 1993)
- **Qualitative Data Analysis** (Miles and Huberman, 1994)
 - External traces of internal processes
 - Extensive consultation with anesthesiologists
 - Coded 6000 phrases or actions
 - Interrater agreement 90% on clinical and 92% non-clinical codes
 - Linked to post-simulation debriefings

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Table 2: Phrases and actions...

Qualitative—focused on process...how did they do things...basic codes built into more abstract patterns

Measures

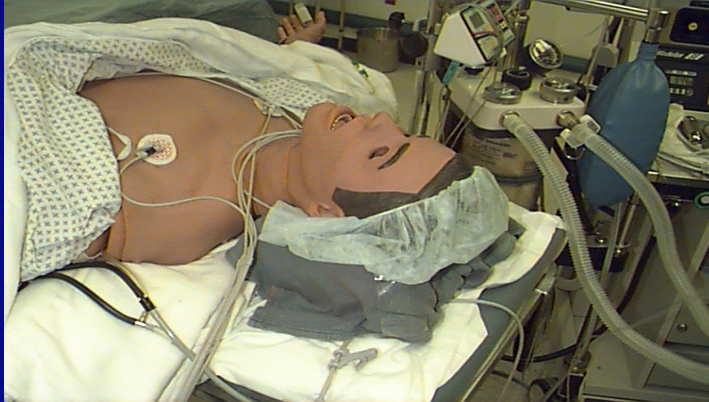
Categorized problem solving by patterns

- Frame:
 - Problem Setting
 - and Evolution (equated with reality or treated as contingent)
- Talk: Use of advocacy and inquiry
- Action: Diagnostic test

Problem solving practices

- Fixation
- Diagnostic Vagabonding
- Balanced problem solving
- Deer-in-the-headlights
- Focus for today:
 - Fixated and Balanced Problem Solvers

What's the Clinical Problem?



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Dr. Poggioli

(His body double)



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Soon after putting the patient to sleep, Dr. Vayanos reports that he is having difficulty ventilating (breathing for) the patient. The mechanical ventilator is straining, so he switches to “hand bagging” squeezing air into the patient’s lungs himself, and adjusts the placement of the breathing tube to assure this is not the problem. Talking with the second anesthesiologist he has called to help, he notes that the airway pressures are very high, and wonders aloud if the problem could be asthma or not enough muscle relaxation in the patient.

This is the beginning of a hunt for the source of the ventilation problem. Vayanos considers everything from a collapsed lung to a broken Y-piece in the mechanical ventilator. He mentions or discusses each of these problems; and sometimes performs partial treatments to address them, or diagnostic tests (e.g. listening to breath sounds) to explore them. The oxygen saturation level drops slowly. By the end of the scenario, Vayanos has partially pursued eight diagnoses and is still adding candidates to his list as the oxygen saturation heads into the 80’s.

Profile of Fixation (N=11)

- Frame: Problem Setting and Evolution
 - The problem: Resolving the known diagnosis
 - Diagnostic lens invisible to clinician
 - Frame = Reality; or my view is complete
- Talk: Advocacy and Inquiry
 - Advocate, don't inquire, don't invite input
- Action: Diagnostic Tests
 - Perfunctory tests and/or
 - No tests and/or
 - Type II (false negative) prone; or confirmatory

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Finding the lost key in the morning...It's here in the front hall somewhere...

Demonstrate or explain the key Diagnostic test: Endotracheal tube (there are others)

At END...

Let's take a look at Table 3...how this plays out over time.

Dr. Ono

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For every diagnosis Dr. Smythe considers, she works to ascertain whether clinical signs support it or whether it can be ruled out. For example, the other anesthesiologist thinks the problem it might be malignant hyperthermia (MH) (overheating due to the anesthesia). Dr. Smythe quickly inserts a temperature probe (which reads normal), and reviews recent changes in clinical signs to see if they have been dramatic (a sign of MH). With MH ruled out, she then considers and treats bronchospasm, turning up the Isoflourane, dosing with albuterol twice and then epinephrine. Getting no improvement in oxygen saturation or airway pressure from these treatments triggers a shift to other diagnoses. Could it be allergic reaction? Pulmonary embolism? (But no likely allergens given and no birth control pills to trigger clots). So she moves on to obstructed tube, suctions and notices the suction catheter does not pass through the tube. She notes the tube is dry but decides this may be because the secretions have dried rather than because there is nothing in the tube (the latter is the common assumption by other clinicians facing this scenario). She then decides to double check the tube with a bronchoscope and identifies a glob of dried secretions and notes that he can't push the bronchoscope through. She removes the blocked breathing tube and places a new one in the patient.

Balanced Problem Solvers (N=9)

- Problem Setting and Evolution
 - Find the diagnosis that convincingly solves the ventilation problem
 - Half: Treat the known (but erroneous) diagnosis, then serially rule out diagnoses
 - Half: Immediately consider 2 or more diagnoses
 - Aware of Diagnostic frames
 - They have diagnoses, the diagnoses don't have [them](#)
- Talk: Advocacy and Inquiry
 - Describe own diagnostic thinking; Inquire
 - Advocate and pair with action inquiries
- Action: Diagnostic Tests

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Follow along on Table 3

State or do tests:

Dr. Klaus: Okay, let's try to suction her. If we can't pass that, we'll have to reintubate her because it's been a long time and we have no idea what her pulse oximeter is reading.

Dr. Smythe: All right. Well, one of the things we can do now, since we're ventilating, is try sucking up the tube and see if she has any occlusion down there, check the position of it...It's pretty dry down there. How long is this endotracheal tube? [Thinks for a second and pushes the catheter in and out.] There is an occlusion at the end of the endotracheal tube.

Dr. Leibnitz' actions: She gets out a new tube and measures its entire length against the suction catheter. Then, marking that point with her finger, she puts the catheter into the tube and finds it shorter than the length of the entire tube.

What about Resolving the Crisis?

- Degree of problem resolution
 - 0-5 point ordinal scale
 - 0 not recognize ventilation problem
 - 1 Recognize it's a ventilation problem
 - 2 Recognize there is some sort of obstruction
 - 3 Recognize the block in the tube
 - 4 Pull out the old breathing (mask ventilate)
 - 5 Put in new breathing tube



Impact of Different Problem Solving Practices

- ANOVA of qualitatively defined groups on degree of solution
 - $F(3,35) = 53.8, p < .001$
 - Balanced problem solvers resolve the crisis

Implications for crisis management

- Automatic reactions of advanced residents at a top medical school not good enough 77% percent of the time
- Basic diagnostic hypothesis testing is *not* second nature
- Developing skill in intra- and interpersonal inquiry moves in problem solving is not a “touchy-feely” luxury but important to maintaining safety and avoiding error

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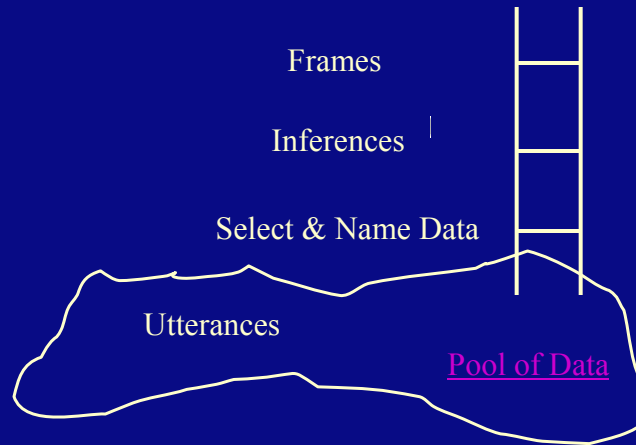


Problem setting: but can't or won't do it when the chips are down. Given what we know about regressing to strongly held responses under threat, setting and solving a differential diagnosis is NOT ingrained.

Your take-aways?

- What's new to you here?
- Questions?
- Comments?

*Basis for reflective practice:
How we make leaps of abstraction*



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Example Two Column Case

What I Thought and Felt	What Was Said
What? Who? . . . What happened to hello? . . . So rude . . . so screw you	(Phone rings) Me: Hello. Caller: Where are you and your ever-loving watching the game? Me: We're not sure.

Two-Column Case Analysis

- Inference:
 - The caller is rude
- How did Steve get there?
 - Data: Caller didn't say hello or identify themselves
 - Frame: People who don't say hello and identify themselves are rude
- Alternative Inference(s): ? ? ?

Case analysis method

- For first-round analysis and action...
 - The focus is on the CASE WRITER
(no matter how annoying, corrupt, or wrong the other person in the case appears)
 - Map the data, inferences and frames of the case writer
 - Data = what was said
 - Inference= case writers interpretation of the data
 - Frame = Pre-existing beliefs or rules that shape the inferences.
 - What new frames and inferences might help the case writer be more effective?



Desired Results

Ask the case writer what they wanted

Consider feelings, relationship and instrumental outcomes

Consider negative outcomes

Watch for espoused frames (they come up often here)

CRITICAL QUESTIONS:

Are these outcomes directly from the dialogue in the case?

Are these outcomes for the casewriter?

Are there both content and relationship outcomes?



Actual Results

Consider feelings, relationship and instrumental outcomes

Consider negative outcomes

CRITICAL QUESTIONS:

Have you captured the heat/passion/intensity?

Do the outcomes implicate the casewriter?

Are the outcomes about the moment from the case?



Actual Actions

[Consider types of speech (framing, advocating, illustrating, inquiring)]

Think in verbs

Look for patterns, when X blanks, then blank
(I.E. When X inquires, take it personally and counter attack)

CRITICAL QUESTIONS:

Have you captured a pattern of action?

Do you have evocative verbs?

Is there an obvious link between the actions and the actual outcomes?



Actual Frames

Ask, what assumptions would you have to make, to take the actual action?

Look for contradictory frames

Think of espoused and in-use frames

Test each frame with the case writer

[Consider developmental action logic]

CRITICAL QUESTIONS:

Are there conflicting frames? (there should be)

Do the frames show why the actions are pure genius?

Are some of the frames casual theories?



Desired Frames

Look for actual frames that could be made more salient

Look for small modifications to actual frames

Go to desired actions (and work back from there) if there's no progress

Look for the opposite of current frames

CRITICAL QUESTIONS:

Does the casewriter think that they could actually hold the desired frames?

Are there frames that are enhancements of actual frames?

Do the frames clearly imply different actions?



Desired Actions

Look for verbs, types of speech, connect to desired frames

Consider desired outcomes

Move from content to process

Consider bypass, name, or engage

Role play what a desired action would look like

CRITICAL QUESTIONS:

Are there specific formulations of the action (actual words to be used)?

Do the actions clearly link to the desired frames?

Is it obvious that the action will produce some or all of the desired results?

Dr. Poggioli's World

- [She's] a little bronchospastic.
- She's very bronchospastic
- She's very bronchospastic, Dr. Knife.
- I need to get the bronchospasm down.
- Well, she's very bronchospastic
- [Telling the surgeon to hold off on the appendectomy] Can you give me time, because she is very bronchospastic.
- *Surgeon:* What is the problem? *Dr. Dini:* Bronchospasms! Asthma!
- We can't ventilate her well because she has severe bronchospasm
- And after intubation she had a very bad broncho-constriction.
- We should get her very deep (increase anesthesia) and then she won't be so bronchoconstricted.

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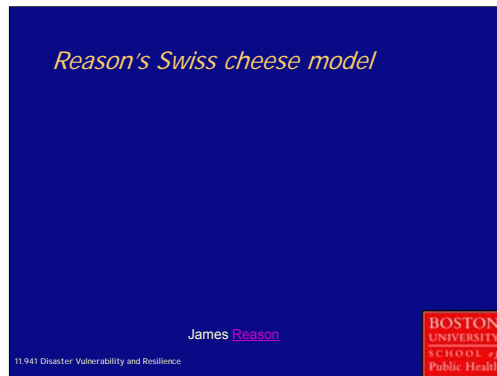
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Balanced Problem Solver's Tests

- Dr. Smythe: Okay, let's try to suction her. If we can't pass that, we'll have to reintubate her because it's been a long time and we have no idea what her pulse oximeter is reading.
- Dr. Ono: All right. Well, one of the things we can do now, since we're ventilating, is try sucking up the tube and see if she has any occlusion down there, check the position of it....It's pretty dry down there. How long is this endotracheal tube? [Thinks for a second and taps the suction catheter against something] There is an occlusion at the end of the endotracheal tube.
- Dr. Leibnitz' actions: She gets out a new tube and measures its entire length against the suction catheter. Then, marking that point with her finger, she puts the catheter into the tube and finds it shorter than the length of the entire tube.
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This is a model developed by Jim Reason, a British psychologist that have spend his life understanding and analyzing accidents all over the world and in any possible sector. Over the last years he have taken an interest into health care as well. Apparently the model can be used here too. What it demonstrates is that an accident is not a result of only one error or mistake. It is a result of failures on many levels.

The holes in the slices of the Swiss cheese illustrators the failures. If one of the holes in the first slice is the presence of a very unusual situation, the holes in the next slice might represent a latent condition or a latent failure that has been in the organization for a long time, and only represents a problem under certain circumstances. The hole in the next slice could be due to a human error and the hole in the last slice could be the lack of barriers against this particular accident from happening.

Since we cannot change the human nature and make pharmacists, doctors and nurses errorprone, we have to look at the other holes in the slices.

But at the same time we have to be aware that in a dynamic environment as health care represents, the holes are constantly changing over time.