Interactive Visualization, Virtual and Augmented Reality to Enhance Teamwork, Situational Awareness, Contextual Intelligence and Cognitive Retention in Medical Simulation

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THE ROADMAP

01 What is the issue?

02 a) What is “Name/Claim/Aim?”
   b) How we use RCDP to teach Name/Claim/Aim

03 Future directions and research
HOW TO BEST ORGANIZE A TEAM IN A CRISIS?
KEY CRM PRINCIPLES

- Clarify Roles – establish an Event Manager
- Communicate effectively – close the loop
- Use personnel/support well – call for help early
- Manage resources – supplies, equipment, OR rooms
- Global Assessment – situation awareness, team updates

*Helps build a High Performance Team*
THE ROADMAP

01
What is the issue?

02
a) What is “Name/Claim/Aim?”
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03
Future directions and research
Recognize turning point, call for help

We have a problem, we have [s/sx], I think it's [dx]

I will be the event manager and I need your help. OK?

These are the next steps, does anyone else have any other ideas?

AIM team with interventions appropriate for signs and symptoms

Oh S###!!

Re-NAME Re-AIM

NAME CLAIM Event Manager, Team Roles
1. NAME

2. CLAIM

   Claim/Delegate the Event Manager

   Claim/Designate team roles

3. AIM

   Aim the Team

   State/Modify the plan

   Specify interventions

   Seek further input

   Consider Emergency Manual

NAME

Name Dx or changes in vital signs out loud

Recap at intervals

CLAIM

Re-name

Re-aim
## Event Manager Checklist

### BASIC Roles

1. Event Manager
2. Circulation -- CPR
3. Airway
4. Drugs
5. Recorder / Timer
6. Resource Person

### Additional Roles

- IVs, Fluids, Labs
- Hx & Chart Review
- **Liaison** v/ External Services & Phone
- Security & Crowd Control
- Technical Equipment
- Monitor Watcher
- Emergency Manual Reader
1. “I’ll be the Event Manager.”
   • Explicitly establishes Event Manager

2. “And I’ll need your help.”
   • Collapses hierarchies, invites input

3. “Okay?”
   • Sets an expectation of commitment to the team process

CLAIM
Suggested script to organize and involve the team
Setting

• Mixed reality: VR + AR in a real classroom (e-REAL)
• Unexpected clinical or non-clinical, emergent scenarios, including extreme, dangerous environmental threats
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Research Questions

1. Is visual storytelling enabling more situational awareness, contextual intelligence and cognitive retention translating into a simulated clinical crisis?

2. Does the association between visual storytelling and the checklist “Name-Claim-Aim” facilitate awareness and teamwork in a simulated clinical crisis?
Research Questions

3. Can pattern recognition be applied to the most complex and crazy situations?

4. The simpler the pattern, the easier the task?
More to Explore

Is brain activity from thoughts, evocation of memories, emotions and visualization able to contribute to the learning process?
More to Explore

What happens when we learn a new action pattern?
Do mirror neurons play a role in this?
LEARNER FEEDBACK THUS FAR IN 2018

• 8 Advanced L&D Teamwork Courses, 65 learners
  • 6 with the mixed reality setting, 51 learners

• Highly positive course evaluations

• Comments from those with mixed reality setting:
  • “Loved the video rehearsals”
  • “Will practice the Event Manager role”
  • “Better identification and earlier identification of Event Manager role”
  • “Use Name Claim Aim in clinical practice”
  • “Apply the strategy of Name Claim Aim & establish role of Event Manager”
Introduction—Scope of the Problem

Obstetric emergencies occur infrequently [1], but like any crises, require organized application of crisis resource management (CRM) principles to facilitate teamwork and provide optimal care [2]. Despite knowledge of CRM principles as described by David Gaba and colleagues decades ago [3], it is challenging for teams to recall and apply these high-level concepts during a stressful maternal and fetal crisis. At the Center for Medical Simulation (CMS) (Boston, MA), a freestanding and high-volume healthcare simulation center which holds over 120 courses per year, we sought to create an easy-to-remember mnemonic that incorporated all CRM principles and was informed by a robust teamwork theoretical base.

CRM Mnemonic Creation

We sought to underscore the importance of psychological safety and fostering speaking up in our diverse groups, which would maximize input and distributed leadership throughout the management of a crisis.

Therefore, we promoted the role of an “Event Manager,” someone designated to encourage team organization as well as updated communication and input from the team. In addition, we encouraged group members to hold a “Basic Assumption” about each other, that everyone was attempting to do his or her best work.

To minimize cognitive load under stress and highlight key actions, we focused our creation on an easy-to-remember mnemonic, into which we incorporated all 11 of Gaba’s CRM principles into a Pre-Name phase and then to “Name/Claim/Aim” to facilitate: 1) “Naming” the clinical problem out loud; 2) “Claiming” the role of “event manager” and asking others to state their roles; and 3) “Aiming” the team with a brief list of interventions. The Pre-Name phase incorporates knowing the environment, anticipating and planning, and calling for help early. The “Name” phase includes effective communication, anticipating and planning, and mobilizing resources. The “Claim” phase is the most extensive, and includes all CRM principles except those included in Pre-Name.

We included a cognitive aid of suggested roles for teams to fulfill. The “Aim” phase includes effective communication, mobilizing resources, using all available information, and using cognitive aids.

Fig. 1: Name/Claim/Aim

Fig. 2: Roles Checklist

Results

To date, we have taught >120 courses from September 2016 to April 2019 where we have introduced N/C/A through RCDP, and explored anesthesiologists’ and obstetric team members’ frames.

Preliminary results indicate there are still a number of barriers for perioperative teams organizing effectively in a crisis.

These include high cognitive load, lack of familiarity or practice with team organizational skills, institutional or practice culture, and cognitive biases.

Conclusions

• Many teams do not organize in crises, despite decades of training
• “Name/Claim/Aim” may be an efficient and effective way to quickly apply 10 of 11 crisis resource management principles
• Optimal training is yet to be determined; further studies are ongoing at sites other than CMS and MGH.

References

RECAP

- Mixed reality setting
- Unexpected scenarios
- Visual storytelling + check-list
- Pattern recognition
- Mirror neurons
- Neurobiology of learning