CLINICAL SIMULATION LEARNING

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ABOUT ME

- ML Instructor at CNA for the past 9 Years
 - Research interests include:
 - Adult Learning (Social Justice, Social Power, Discourse Learning)
 - Workplace Learning (Educational Commodification, Compliance Learning)
 - Professional identity development and its associated meanings
 - Health care professional education and professionalization processes

- Please Note:
 - Opinions and perspectives are my own and do not necessarily reflect the perspective of my employer

SIMULATION LEARNING IN HEALTH CARE (SIMULATION IS IN - WHY?)

- Engages multidimensional aspects of learning, not just explicit knowledge
- Allows student to engage in highly contextual unfolding scenarios
- Embraces aspects of both <u>experiential learning</u> and <u>tacit learning</u> (Bottom of the Iceberg)
 - Experiential Learning
 - Tacit Learning
- Can be very valuable in engaging aspects of professional behaviour formation
- AT CNA WE USE A LOT OF SIMULATION



SIMULATION LEARNING (WHAT IS SIMULATION?)

- Loaded question
- Simulation runs the gambit from virtual reality to simple conversations
 - Sometimes viewed within two primary forms (Levin, Demaria, Schwartz & Sim, 2015)
 - Replacement Systems
 - Serve to replace that which is pre-existing
 - Enhancement Systems
 - Serve to enhance what you already have
- These days attention often focuses on high-fidelity and it know doubt has its place and can be highly beneficial
- But does High Fidelity necessarily = Better learning experiences?



SIMULATION HAS ITS DOWNSIDES

- For Medical Laboratory Science
- <u>Simulation is expensive (and PSIs are running out of money)</u>
 - The costs can be astronomical
 - Investment in capital equipment (Analyzers, Laboratory Space, Minor equipment)
 - Start-up costs are particularly high
 - Operational costs are high (gloves, lab-coats, reagents etc...)
 - Human resources can be demanding as expertise is required in each of the lab areas along with support
- Given ongoing trends in higher learning, it is likely that funding decreases will continue and expand
- For reference: In NL
 - Approximate cost per MLT student (capacity of 30) = \$35,000 per annum
 - (2011, Government of NL MLT Workforce Model Report)
 - Approximate tuition for CNA student (\$2,320 per annum)

SIMULATION HAS OTHER DOWNSIDES

• IN MLS

- Simulation reduces exposure to <u>"real life"</u> clinical environments
 - What does "real life" actually mean?
 - Anecdotal arguments center around value of "on the job training" vs classroom, adequate clinical preparation, and the ability to accurately simulate the "real world"
 - Ongoing concerns arise relating to ideas of minimum competence and proficiencies
 - Employers want proficiency (understandably)
 - Proficiency is not the mandate of the CSMLS exam nor necessarily educational institutions



COLLEGE OF THE NORTH ATLANTIC



- Newfoundland and Labrador's public college
- 17 campus along with a campus in Doha
- A lot of programs
 - Academics
 - Applied Arts
 - Business studies
 - Health Sciences
 - Industrial Trades
 - Information Technology
 - Natural Resources
 - Tourism

MLS PROGRAM AT CNA

- 3 years (First qualified, first admitted)
- 1 year general studies (academic minimal MLS)
- 2 years MLS focus with **BLOCK TEACHING**
- Year 2
 - 2 15 Week Semesters (Didactic with basic lab skills)
 - 6 Weeks simulation (Intersession)
 - 2 Weeks Clinical Practicum (pre-analytical)
- Year 3
 - 15 Weeks simulation
 - 15 Weeks practicum (which is also a type of simulation!)



MLS SIMULATION AT CNA

- CNA has been operating the same or similar model for 35+ Years
 - It wasn't always called simulation (it was just how we did it)
 - It erupted from clinical settings not wanting students for extended duration and the bottleneck effect of clinical placements....Sound Familiar?
 - Strong Employer feedback
 - Students are well prepared for clinical practicum (Only 15 weeks in 3rd year)
 - No use of clinical instructors (preceptors only)
 - Vast majority of students obtain immediate employment in MLS and data indicates they are well prepared for employment
 - Clinical settings are not overloaded with students and they keep hiring our graduates
- Bottom Line: Simulation Can Work....And It Can Work Well

OUR MLS SIMULATION APPROACH

- Some replacement
 - Simulation at CNA can serve to replace or aid select competencies which are difficult to achieve clinically in NL
 - Simulation also serves to reduce/replace longer clinical practicum requirement
- Largely enhancement and Preparatory Approach
 - Simulation at CNA largely serves to enhance learning through pre-clinical practicum experience.
 Examples:
 - Routine laboratory analysis
 - Routine Analyzer operation
 - Lots of QC

HOW DO WE MAKE IT WORK? (ESPECIALLY IN COST CONSCIOUS TIMES)

#1 Strong Partnership with Industry! #2 4 R's (Reduce, Reuse, Recycle your Reagents) #3 Creativity around simulation practices

#4 Long term, discipline specific capital investment

#5 Experiential pedagogy with strong connections to CSMLS competency profile, accreditation requirements, and employer needs

#6 Continuous improvement through student input

#1 STRONG PARTNERSHIP WITH INDUSTRY

STRONG PARTNERSHIP WITH INDUSTRY

- In NL we are very fortunate
 - Almost all laboratory managers/leaders/educators etc... are graduates of the CNA program
 - This creates a high <u>"alumnus factor</u>"
 - High alumnus factor translates to:
 - Strong industry understanding program needs
 - Connection to the school which continues well into career
 - High degrees of communication between CNA and industry
 - Highly productive advisory and liaison committees
 - Our clinical partners (RHAs) are active, very supportive, and take their student responsibilities very seriously

STRONG PARTNERSHIP WITH INDUSTRY

- This has tangible benefits for simulation and experiential learning
 - Free stuff!
 - Expired reagents alone can substantially reduce the cost.
 - CNA keeps abreast of industry needs and we can train students for the workplace
 - Our students are given opportunities to rotate through clinical training sites for short term learning of high cost instruments
 - Flow Cytometry
 - Mass Spectrometry
 - Molecular Genetics
 - Networking opportunities for students at provincial conferences





STRONG PARTNERSHIP WITH INDUSTRY!

Here are just some of the benefits from our partnership

The Elite was recently donated and is fully operational.

STRONG PARTNERSHIP WITH INDUSTRY! SAMPLE OF COMMUNICATION CURRENTLY IN PLACE

Advisory Committee

- CNA leadership with industry leadership (meets at least once per year)
- Liaison Committee
 - CNA faculty with industry middle management (meets at least once per year with continuous bilateral communication)
- Clinical Program Leader
 - Single CNA faculty member who is in constant bilateral communication with clinical lower and middle management relating to clinical placement and program goals

WE FOCUS ON DIRECT COMMUNICATION!

• This also helps considerably with meeting our accreditation requirements

#2 4 R'S (REDUCE, REUSE, RECYCLE YOUR REAGENTS)

4 R'S (REDUCE, REUSE, AND RECYCLE REAGENTS)

• Be a Scrounger

- If a clinical setting asks if we can use it.
- The answer is **ALWAYS YES**!
- Example
 - Old broken analyzer might not work but students can learn a great deal taking one apart, going through the maintenance or even changing a probe.
 - Engage Tacit Learning!

Dictionary	
scrounger	Q
SCroung · er /'skrounjer/ •)	
 a person who borrows from or lives off others. synonyms: beggar, borrower, parasite, cadger; More a cleverly resourceful person who finds and procures items for a specific purpose. "no team at camp had a better scrounger than our Eddie" 	
Translations, word origin, and more definitions	

4 R'S (REDUCE, REUSE, AND RECYCLE REAGENTS)

- Other examples:
 - Expired controls make great "human samples"
 - In Blood Bank Expired antisera lasts forever and ever (CM A/D I have is older than I am)
 - If anyone would like some Anti-e I have lots 🙂
 - Reagent RBCs (panels) easily last up to 8 months if properly stored

Dictionary	
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4 R'S (REDUCE, REUSE, RECYCLE YOUR REAGENTS)

• BE CHEAP WHEN IT'S SAFE AND EFFECTIVE

- Simple Example in a Basic Forward GS method
 - SOP says:
 - Add 2 drops of Anti-A to tubes labeled Anti-A, Anti-B, Anti-AB
 - Add 1 drop of 3-5% washed RBCs
 - Spin and Read
- Why use 2 drops when 1 will give you a good reaction.
 - <u>Is it essential to learning to simulate the real world exactly?</u>
 - Or is it more important to engage the experiential and tacit aspects of working through procedure as a means of building competence?
- Why not dilute your anti-sera 2:1 with saline before students complete the lab?
 - I DO at 4:1 actually

4 R'S (REDUCE, REUSE, RECYCLE YOUR REAGENTS)

• Bottom line

- Don't be a strict lab tech (think outside the lab box)
- Lab techs like things to be organized, orderly, neat, and ideal.
- Teaching and learning <u>do not require</u> ideal environments
- Teaching and learning embrace problem solving, mistakes, and imperfect scenarios

#3 CREATIVITY AROUND SIMULATION PRACTICES (JUST A COUPLE OF EXAMPLES)

CREATIVITY AROUND SIMULATION PRACTICES

- A "Martha Stewart Method" in our 2nd Year Micro Lab Simulation
- A Microbiology Example:
 - Students set up throat cultures (not real specimens) for 16 hour incubation and follow-up
 - The day before we have our instructors collect swabs of themselves for us, we randomize them and plate them on BA. Then to half of them we add a very thin layer (from 1 small colony) of stock *S.pyogenes*
- At the start of the day:
 - Students plate their specimen (not real)
 - Then they place it in the incubator
 - They are then given a "Martha Stewart" plate that has just come out of the oven.
- Students can then process the plate as if it were their original immediately rather than 16 hours later.

AN LIS EXAMPLE

- This one is being worked on right now
- Employers have steadily asked for MEDITECH training
- Setting up a MEDITECH system at CNA has proven cost prohibitive
- So....
 - I am building our own system using Open Source Software Like Google Classroom, Drive, and Dropbox
 - We are also exploring using old iPods as data access points within the lab
 - With good IT support, modern WIFI, and old technology you can create your own simulated LIS for virtually nothing

SIMULATED CORD CELLS

- Take 8 O pos donors (EDTA patient specimens)
 - Add 1-2 mls of human source Anti-D
 - Incubate 60 mins
 - Take off the serum and give to students as cord specimen
- Give them one cord specimen along with 3 other normal EDTA specimens and let them do a routine ABO grouping/DAT on the specimens and process it like a laboratory would
- Have them work through the scenario and allow them to make their own conclusions on the next step.
- Throw in case history and background.
- Guide the students but don't direct!

#4 LONG TERM, DISCIPLINE SPECIFIC CAPITAL INVESTMENT

LONG TERM, DISCIPLINE SPECIFIC CAPITAL INVESTMENT

- The biggest cost to simulation is the start-up & the second biggest cost is keeping it going
 - We go through a lot of consumables (reagent, gloves, face shields, needles etc...)
- This can be mitigated with a proper investment strategy over a period of time
- Simulation does not have to be an "all or nothing" attack
 - You don't need to simulate all disciplines equally
- CNA maintains a list of must haves, nice to haves, and a wish list
- When funding becomes available we prioritize but we always have our finger on the trigger of a wish list item
- We NEVER SKIMP on SAFETY! IT IS THE NUMBER 1 PRIORITY IN SIMULATION LEARNING WITH LIVE SPECIMENS

LONG TERM, DISCIPLINE SPECIFIC CAPITAL INVESTMENT

- Utilize organizational development departments.
- PSIs spend huge amounts of time and energy seeking financial aid form alumni, partners, etc...
- How many ask for equipment as its being decommissioned?
 - We do!
- Seek industry donations and reward donors through community involvement. How often do you bring industry in and reward them with publicity?
- Build supplies by budgeting for larger numbers of students than you expect to graduate

#5 EXPERIENTIAL PEDAGOGY ALONG WITH STRONG CONNECTIONS TO CSMLS COMPETENCY PROFILE, ACCREDITATION REQUIREMENTS, AND EMPLOYER NEEDS

STRONG CORRELATIONS WITH THE CSMLS COMPETENCY PROFILE

- Simulation is the new buzz word but its not new
- Don't do simulation for the sake of it
 - If you are covering an area well, and you have good performance indicators, why simulate it? Will it help the students or alter costs?
 - Look at your programs, training endeavours, and goals and align simulation to the Comp Profile
 - Always align simulation goals with an existing pedagogical strategy or philosophy

SAMPLE 1 WEEK BLOOD BANK SIMULATION (COMPETENCY BASED)

	AM	РМ	Day(s) Covered	Objective #	Standard(s)
Day l	Safety Orientation 6 Prenatal Specimens (ABO, RH, Ab Screen)	6 MPG on Prenatal Specimens	12345	1	Adhere to safety regulations to the extent of no more than two supervisory corrections per rotation.
			1234	2	According to the protocol of the Transfusion Science Laboratory, prepare specimens properly with no more than two supervisory corrections per rotation.
Day 2	l Complex Prenatal w/follow-up	Additional follow-up	1234	3	Record results accurately with no more than two errors per rotation.
					interpret results accurately with no more man two errors per rotation.
Day 3	Crossmatch 2 patients with 2 units using full major crossmatch technique (manual) Discussion surrounding crossmatch with atypical antibody and rule of three	IDAT phenotype for complex patient requiring phenotypically negative units Case study # 1 - TR Case study # 2 - Phenotype error Case study # 3 - Massive TR Protocol			Communicate clearly and appropriately with no more than two supervisory corrections per rotation.
			1234	4	Perform appropriate quality control procedures in conjunction with designated techniques as per established protocol with no amore than two supervisory corrections per rotation.
					Accurately assess the acceptability of results based on established quality control procedures with no more than two supervisory corrections per rotation.
					Use resources efficiently to minimize wastage
			124	5	Within 4 hours perform a routine transfusion science work-up (ABO, Rh, antibody screen) on six patients, with 100% accuracy.
					Within 4 hours perform an antibody screen and full crossmatch on two patients using two donor units for each, with 100 $\%$ accuracy.
Day 4	Antibody titer of anti-x in the presence of anti-y MTS Ab Screen of 3 Specimens Capture An Screen of 3 Specimens	Review of Automation Final Exam Part 1			Within 2 hours perform three antibody screening tests using the MTS system, with 100 $\%$ accuracy.
					Within 2 hours perform three antibody screening tests using the CAPTURE-R system, with 100% accuracy.
			3	6	Within 6 hours, identify a single antibody or a simple mixture of two common antibodies, with 100 % accuracy. Testing to include ABO group, Rh, antibody screen, panel(s) and confirmatory phenotyping.
			14	7	Within four hours, perform a Rh phenotype (D,C,E,c,e) on six patients and report the most probable genotype with 100 $\%$ accuracy
Day 5	Final Exam Part 2	Repeat outstanding competencies if necessary			Within 2 hours, perform a red cell phenotype, on one patient, using the antihuman globulin technique, incorporating appropriate controls, with 100% accuracy.
			4	8	Within two hours, perform one antibody titration using the antihuman globulin technique.

EXPERIENTIAL EDUCATION

- Kolb's Learning Cycle is fundamental to our simulation
- Concrete experience.
 - In Kolb's model one cannot learn by simply watching or reading about it, to learn effectively the individual, team or organisation must actually do
- Reflective observation.
 - Take time-out from "doing" and stepping back from the task and reviewing what has been done and experienced.
- Abstract Conceptualisation
 - Make sense of what has happened and interpret the events and understanding the relationships between them. Draw upon theory from textbooks to explaining events, models students are familiar with.
- Active Experimentation
 - Consider how put what has been learnt into practice. For learning to be useful most people need to place it in a context that is relevant to them. If one cannot see how the learning is useful to one's life then it is likely to be forgotten very quickly.



#6 CONTINUOUS IMPROVEMENT THROUGH STUDENT INPUT (LAST BUT CERTAINLY NOT LEAST)

CONTINUOUS IMPROVEMENT THROUGH STUDENT INPUT

- Research costs only a few minutes of your time and can readily direct your simulation
- SurveyMonkey is free!
- The best people to talk to about your simulation experiences are your students
 - Don't limit your feedback to institutional feedback!
 - Ask your students
 - Involve your students in simulation planning!
 - Don't just rely on your own faculty to demonstrate effectiveness of simulation
- Regarding QC for example, we recently conducted interviews with students post-clinical to inform our decisions regarding changes to pre-clinical simulations

QUESTIONS?

Feedback or comments:

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