



INTRODUCTION

- High fidelity simulation-based inter-professional team training can help hone teamwork skills.
- The key to its success in this context is having a reliable, effective, and efficient measurement of teamwork to assess performance.
- To date, quantitative measures of teamwork skills in healthcare are still lacking due to the difficulty in developing them.
- The physical location and movement of members during their interaction could serve as one such quantitative measure of teamwork.
- We investigated the feasibility of using radiofrequency identification (RFID) tags during simulation-based training (SBT) to measure teamwork.



METHODS

- Quasi-experimental, pre-/post-intervention comparison design.
- Student Operating Room Team Training (SORTT) curriculum involving nurse anesthesia, senior medical, and senior undergraduate nursing students.
- Dual scenario format with immediate after-action debriefing.
- Evaluation of team-based performance for each scenario using quantitative measurement suite and observer-based Quick Teamwork Assessment Scales Revised (rQ-TAS), a 5-item, 3-subscale tool using a 6-point Likert-type scale (1=definitely no to 6=definitely yes).
- Analysis of variance (ANOVA) compared the combined mean positional localizations of RFID tags worn by designated learners in the role of surgeon, scrub nurse, circulating nurse, and nurse anesthetist to each of the four RFID anchors located in the room between the two scenarios.
- The significance threshold for the p-value was less than 0.05.

METHODS (CONT.)

TRAINING SETTING



TRAINING FORMAT

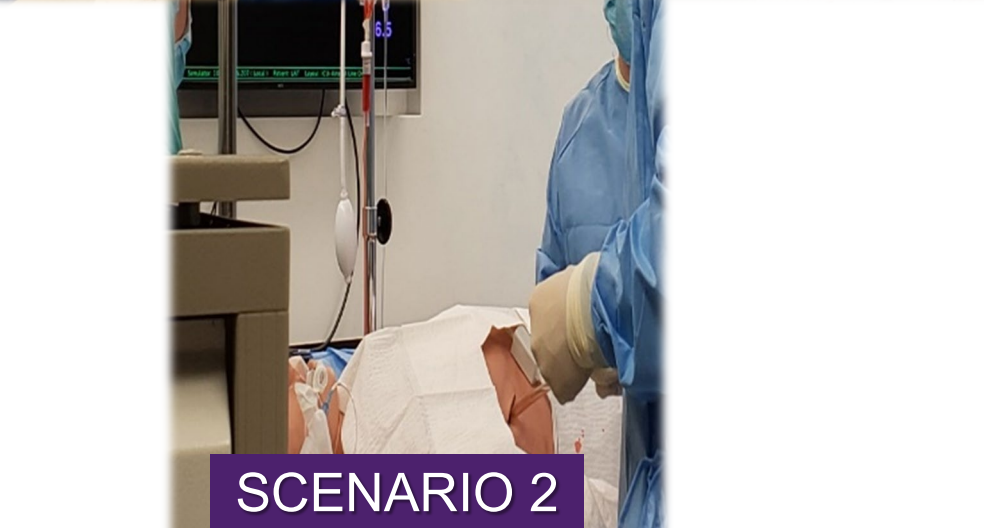


^aScenario 1 → stab wound to abdomen; Scenario 2 → local anesthetic toxicity
^bTeam-based competencies

ORIENTATION



DEBRIEF 1



TEAM ROLES / COMPOSITION

PRIMARY & SECONDARY
NURSE ANESTHETIST
(CRNA 1 & 2)

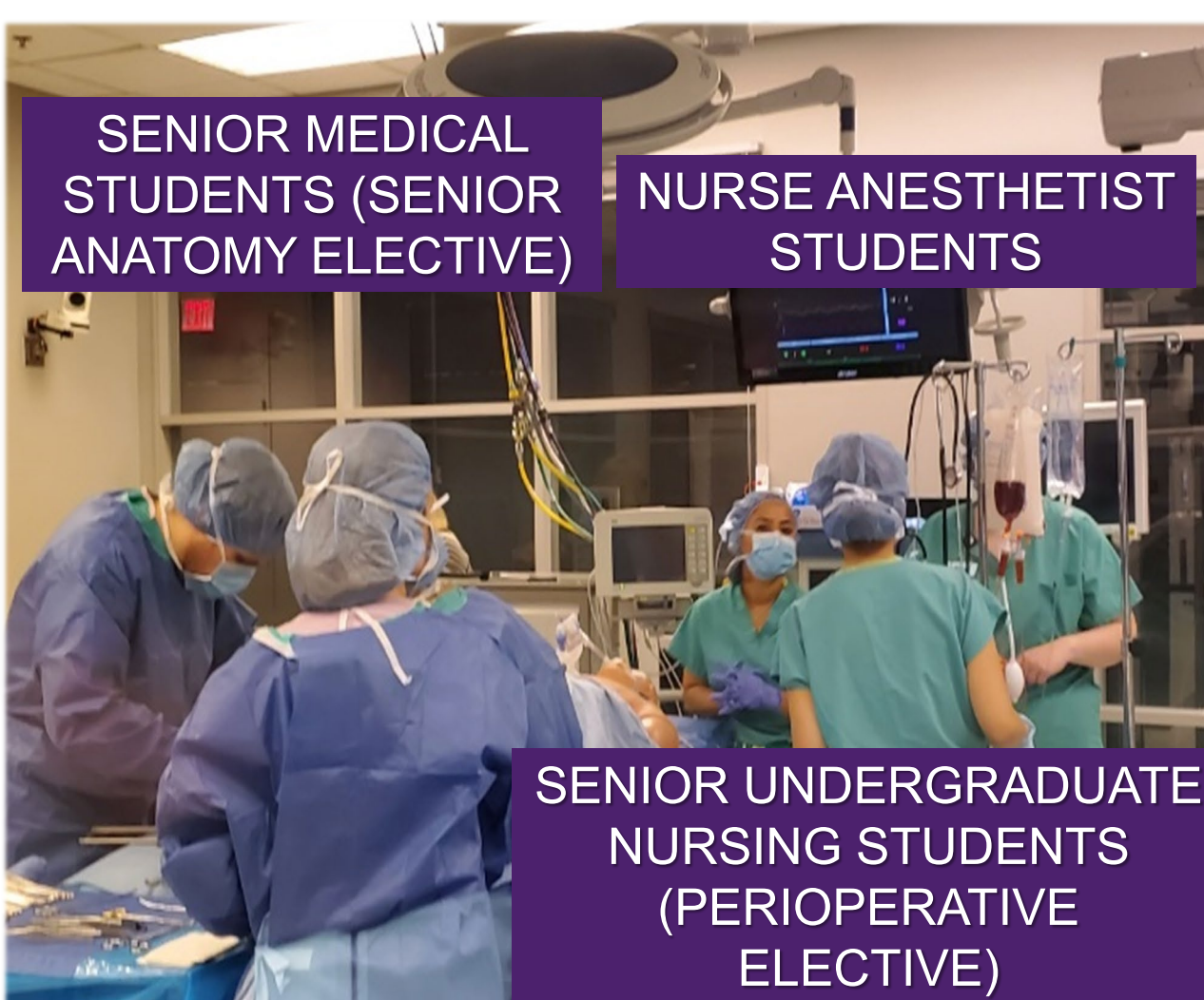
SCRUB NURSE /
TECHNOLOGIST

CIRCULATING
NURSE



PRIMARY SURGEON & SURGEON
ASSIST (SURGEON 1 & 2)

STUDENT PARTICIPANTS



SENIOR MEDICAL
STUDENTS (SENIOR
ANATOMY ELECTIVE)

NURSE ANESTHETIST
STUDENTS

SENIOR UNDERGRADUATE
NURSING STUDENTS
(PERIOPERATIVE
ELECTIVE)

OBSERVER-BASED TOOL

012345678910 Quick Teamwork Assessment Scales Revised (rQ-TAS 2022) ID NUMBER: _____

Date: _____ Scenario: Scenario 1 (Stab Wound) Scenario 2 (Elective)

SCALE 1: Individual Performance During the Scenario: Starting with Item 1, work across each row; first, rate the performance of each of the team members before going to item two. Consider all opportunities that were available during the case to perform the item behavior. Mark "N/A" only when the item is not applicable.

Response Scale: Definitely No = 1, 2, 3, 4, 5, 6 = Definitely Yes

To what extent did each team member demonstrate each of the following items during the patient case?

	Physician 1	Physician 2	CRNA 1	CRNA 2	Circulating Nurse	Surgical Tech
1. Established group rapport easily by demonstrating courtesy and respect, and communicated effectively with team members throughout the case, even during stressful situations (e.g. difficult patient, time constraints, patient complaints and/or team questions, provided explanation as needed).	123456N	123456N	123456N	123456N	123456N	123456N
2. Demonstrated priority for quality care and patient safety through individual performance and commitment to continuous improvement and responsibility for overall team effectiveness (e.g. use of information and feedback from team members, effective performance without delay, responded to requests promptly, voluntarily assumed team responsibility as needed, incorporated team needs, feelings, and preferences).	123456N	123456N	123456N	123456N	123456N	123456N

SCALE 2: Team Interactions: Respond to each item based on your team's performance as a whole, during this case. Mark "N/A" only when the item is not applicable.

Response Scale: Definitely No = 1, 2, 3, 4, 5, 6 = Definitely Yes

To what extent did the team's performance, as a whole, reflect each of the following characteristics?

	1	2	3	4	5	6
1. Maintained an overall awareness of the clinical (i.e. patient's) situation by demonstrating a common understanding of what each role and responsibility, anticipating and responding effectively to patient and team member needs, and recognizing a shared hierarchy in the team as appropriate to the case.						
2. Communicated openly and flexibly with each other and used strategies to ensure clarity.						
3. Utilized shared data for decision-making, including individual expertise, identified capacity, and ongoing updates.						
4. Collaborated and effectively to change in the clinical environment (e.g., workflow, resources, environment) (change, process, protocol).						

Additional Comments (including any examples of particularly strong or weak performance, or descriptions of unique circumstances or observations): _____

Thank you! _____

Original tool construction: Cheasin SW, Paige JT, Yang J (2006, 2007, 2008)

Quick Teamwork Assessment Scales Revised (rQ-TAS 2022)

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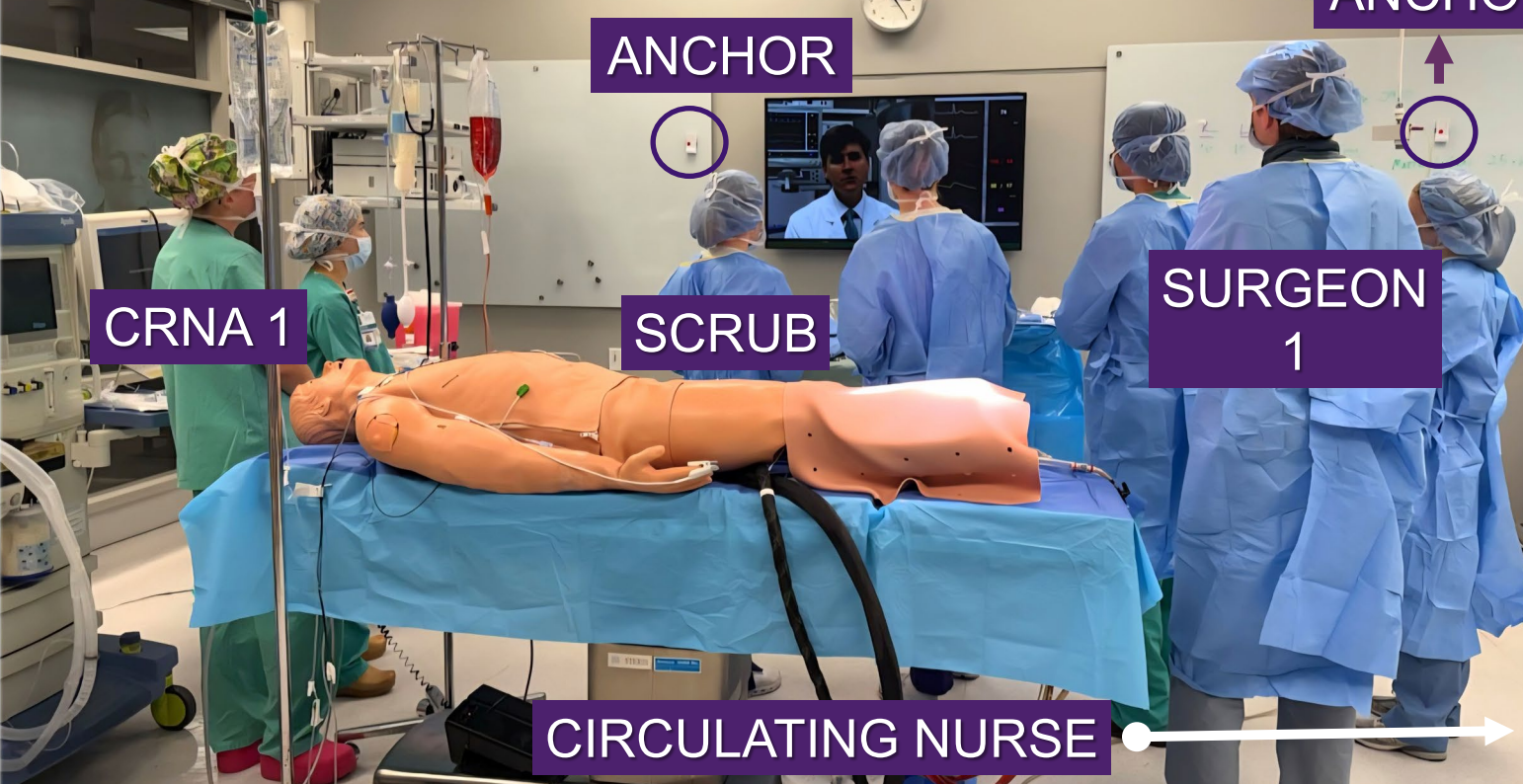
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RFID PLACEMENT



ANCHOR

ANCHOR

CRNA 1

SCRUB

SURGEON 1

CIRCULATING NURSE

RESULTS



MATCHED PARTICIPANT DATA (2020 – 2021)

PARTICIPANT BREAKDOWN	2020	2021	TOTAL
MEDICAL STUDENTS	26	18	44
UNDERGRADUATE NURSING STUDENTS	6	3	9
NURSE ANESTHESIA STUDENTS	18	10	28
TOTAL	50	31	81

OBSERVER-BASED TOOL (2020)

QUICK TEAMWORK ASSESSMENT SCALES REVISED (rQ-TAS)					
rQ-TAS subscales	Scenario 1 scores		Scenario 2 scores		P-value
	N	Mean (Std Dev)	N	Mean (Std Dev)	
Team-based behaviors					
Item 1	49	3.52 (1.16)	49	4.69 (0.85)	<0.001
Item 2	49	3.78 (1.03)	49	4.73 (0.81)	<0.001
Shared mental model					
Item 3	7	3.43 (1.13)	7	4.86 (0.69)	0.047
Adaptive communication and response					
Combined Items 4 and 5	7	3.07 (1.17)	7	4.64 (0.94)	0.045

RFID POSITIONING

Year	Role ^a	Scenario 1 ^b				Scenario 2 ^b			
2020/2021		Anchor Position				Anchor Position			
		9A0B	D223	0A38	078D	9A0B	D223	0A38	078D
	Physician (N=6)	4431 (973)	3373 (675)	3954 (759)	4207 (752)	3346 (1119)	4372 (493)	4063 (1245)	4061 (794)
	Circulator (N=7)	4728 (585)	4236 (1107)	4893 (7210)	4204 (1104)	4147 (791)	4415 (896)	3724 (709)	5165 (496)
	Surg Tech (N=7)	4409 (724)	3901 (1145)	4414 (617)	4125 (1126)	4369 (716)	3790 (1012)	4673 (697)	3712 (1043)
	CRNA (N=6)	3215 (705)	3146 (1015)	4856 (283)	4908 (440)	4694 (837)	4661 (1244)	3929 (167)	3889 (645)

^aSurg tech = surgical technician, CRNA = certified registered nurse anesthetist; ^bMean (standard deviation), bold italicized values indicate statistically significant ANOVA comparison of matched tags (9A0B, D223, 0A38, 078D) from scenario 1 to scenario 2.

CONCLUSIONS

- Measurement of team member movement using RFID tags during SBT of inter-professional student teams is feasible, demonstrating significant changes in circulator and nurse anesthesia positioning.