

Setting-up the ideal Robotic Surgical Programme; a qualitative interview and observational study

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Introduction: Robotic surgery is a relatively new surgical modality. Thus, surgical teams may face logistical challenges for set-up, safety and efficiency with the robot as a new “team member”. The aim of this study was to explore staff experiences for adapting to new working approaches at two tertiary established robotic centres to inform how to ensure high quality outcomes.

Methods: Qualitative staff interview and theatre observational study at two tertiary UK hospitals, open to all staff utilising surgical robots regardless of discipline, role or experience. One-to-one interviews were audio recorded and transcribed verbatim. Robotic procedures were observed by trained researcher and laparoscopic/open procedures were added for comparison; field notes were taken contemporaneously, including diagrammatic representation of theatre setup. Qualitative analysis was conducted using grounded theory approach.

Results : Twenty-nine participants (26 interviewed) were recruited to the study (11 females) and 134 (109 robotic) hours of observation were completed (tables 1&2). Data coalesced around three major themes relating to 1) The Robotic Team, 2) Theatre processes and 3) Staff emotions (table 3).

Table 1: Staff participants.

Role	No	Discipline	No
Surgeons	8	Urology	17
Trainees	5	Gynaecology	7
Anaesthetists	5	Anaesthetics	3
Surgical assistants	4	Cross discipline	2
Nurses	4	Total	29
Healthcare assistants	2		
Operating department practitioners	1		
Total	29		

Table 2: Observed procedures.

Route	Urology	Gynaecology	Colorectal surgery	Total
Robotic	13	5	2	20
Laparoscopic	2	1	0	3
Open	1	1	0	2
Total	16	7	2	25

Table 3: The major data concepts and underlying categories.

The Robotic Team		
Team Structure and consistency	Training and experience	Teamwork and support
Robotic Theatre Environment		
Theatre processes and efficiency		Patient outcomes and safety
Robotic Staff Emotions		
Positive emotions		Negative emotions (active and passive stressors)

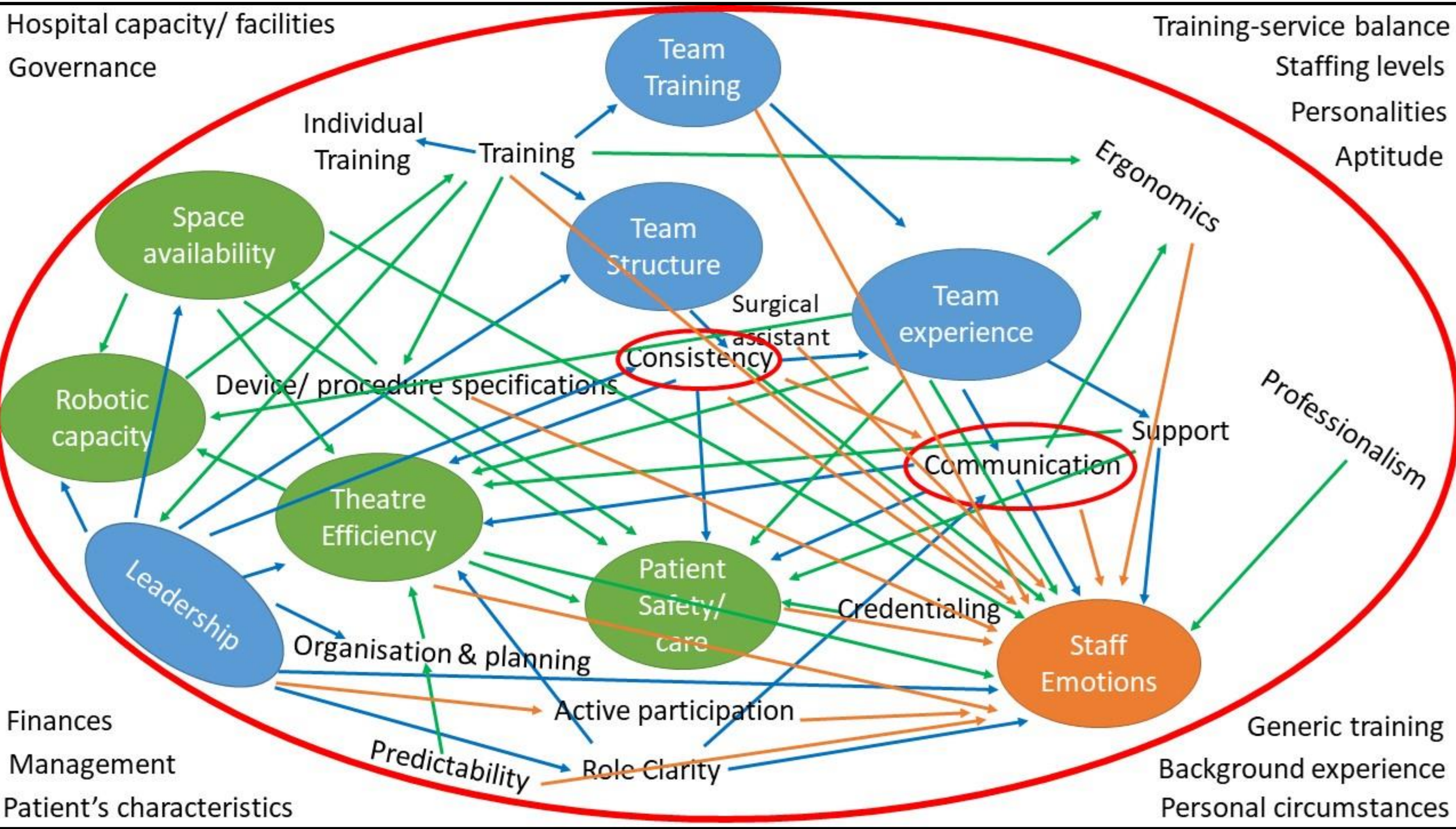


Figure 1: Diagrammatic representation of the complex relationships between various aspects of the three major concepts; the **theatre environment (green circles)**, the **robotic teams (blue ones)** and their **emotions (orange circle)** as per qualitative data analysis. Important linking aspects between all of these themes were Communication and Consistency (**small red circles**) of both staff and process. The **big red circle** represents the immediate robotic theatre environment, with factors beyond it affecting staff experiences.

Discussion:

Strengths

This study presents the first in-depth analysis of the impact of presence of the surgical robot on theatre dynamics and team interactions. It sets a theoretical framework for setting up a safe and efficient robotic programme to provide quality patient care. This may guide hospitals and teams wishing to adopt robotic surgery regardless of surgical discipline.

Limitation

This theory will need to be tested with the newer open-console and multi-quadrant robotics.

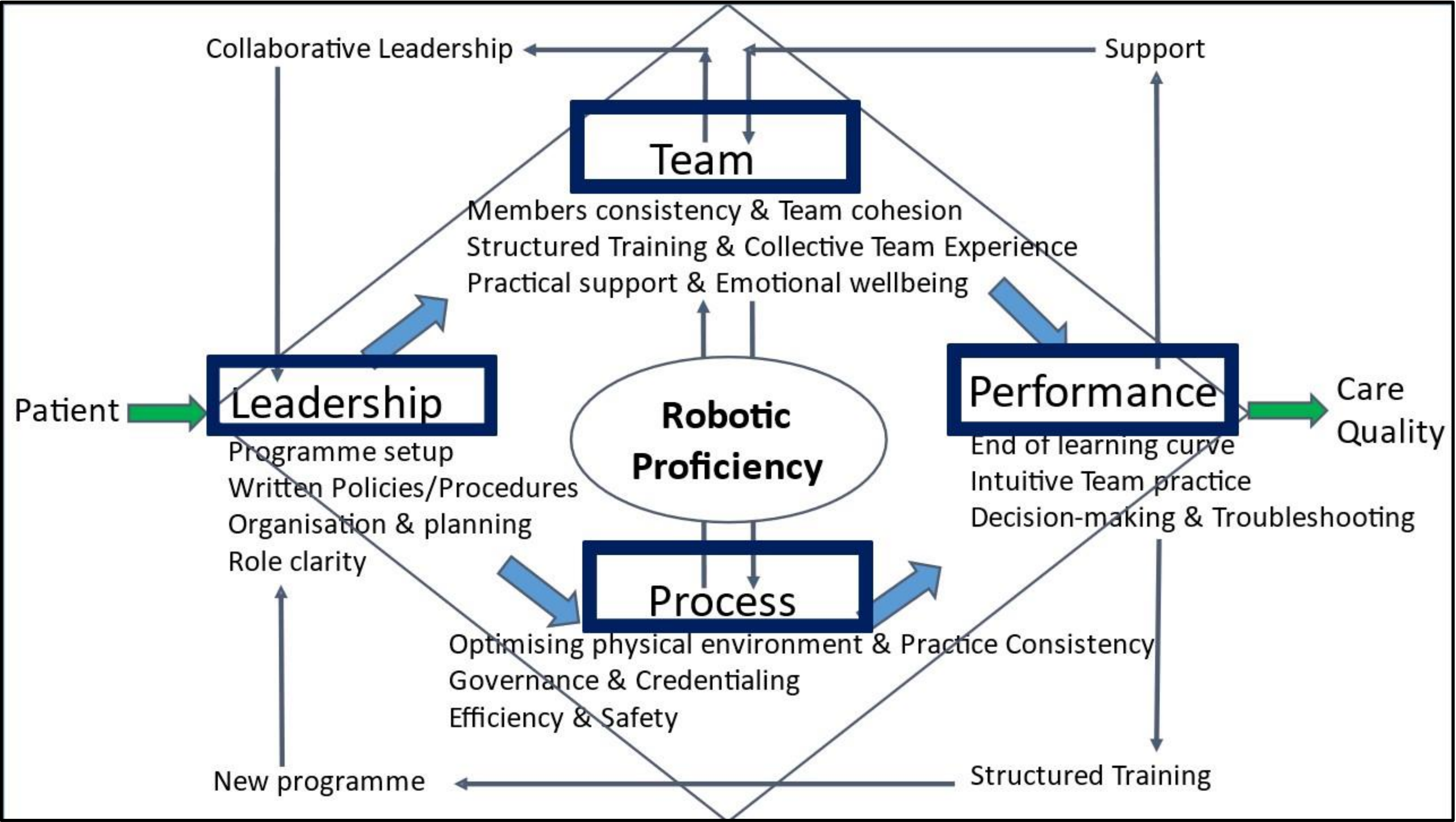


Figure 2: Robotic Proficiency theoretical framework. Data synthesis and comparison within and between different robotic teams proposed a robotic proficiency theory which relies on four major pillars: 1. Collaborative and supportive leadership, with role and practice clarity, 2. Consistent, well-trained and supported team, 3. Consistent, safe and efficient processes with robust governance framework, and 4. Optimal performance at the end of the team’s learning curve. While these factors may also apply to other surgical setups, they were found to be particularly important within the robotic setting due to its specifications: 1) Being a new technology requiring specialist training and change of established routines and departmental culture, 2) Surgeon-Team separation (most specific to robotics) that can cause reduction in surgeon’s situational awareness, reduced staff engagement and communication challenges and 3) large equipment size with relative theatre space constraints.

Conclusion:

Robotic theatre staff experiences described four pillars of proficiency in robotic theatres, that lead to provision of quality patient care. These are: 1- Collaborative supportive **Leadership**, 2- Consistent well-trained & well-supported **Team**, 3- Consistent safe and efficient **Processes**, and 4- Optimal robotic **Performance** (end of team learning curve).