Hub: New York University School of Medicine
Grant: TL1
Category: Team Science
Contact Info: Cathleen Kane, MPA. Director of Evaluation and Team Science - cathleen.kane@nyulangone.org and Elana Lipschitz, Program Coordinator – elana.lipschitz@nyulangone.org

Team Science: For TL1 Trainees & KL2 Scholars

A Team Science “Flipped Classroom”
Presented by: NYU Grossman School of Medicine and NYU Stern School of Business

- Diverse, Multidisciplinary Groups
- Active, Experiential Learning
- Peer-to-Peer Support
- Concrete Strategies for Navigating Relationships with Leadership
- Led by Professor of Management

Issue Being Addressed

- Team Science:
The CTSI Translational Research Education and Careers (TREC) program recruits participants from across the colleges and schools of New York University, a notably large institution with a diverse and multi-disciplinary array of student communities. These include: School of Public Service, School of Culture, Education and Human Development, School of Arts and Sciences, Institute of Graduate Biomedical Sciences, College of Nursing, School of Engineering, College of Dentistry, School of Social Work, and College for Global Public Health. While this diversity of backgrounds, ambitions and perspectives is a core strength of the TREC program, it can also present challenges to Team Science.

- Challenges of a Diverse Program or Team:
  o "Horizontal Barriers" collaboration between Basic Science, Clinical Science, and Social Science trainees is one critical issue, because it is often difficult to encourage trainees to work with others outside of their field. Teams may also need to navigate challenges around working in different locations or time zones.
“Vertical Barriers” collaboration between senior and junior researchers also presents its own set of issues, due to asymmetrical power dynamics and availability of resources; attribution concerns; and differing work cultures and/or communication styles.

**Approach Implemented**

- **New Training in Team Science:** The CTSI TL1 program has developed rigorous training targeting pre-doctoral and post-doctoral students committed to working in clinical and translational health and healthcare research. TL1 trainees meet bi-weekly to discuss each other’s projects in addition to monthly meetings with their mentoring committee. The TL1 program requires course didactics as well as other developmental workshops, seminars, and research networking events beneficial to the trainees' career. One relatively new area of enhanced didactic instruction is in support of Team Science.

- **Expanded Institutional Partnership:** In previous cycles, the TREC program has traditionally worked with NYU Langone Health (NYU Grossman School of Medicine); other Schools and Colleges of NYU; NYC Health + Hospitals; and the Nathan Kline Institute of Psychiatric Research. Starting in 2019, TREC also partnered with the NYU Stern School of Business to develop a well-received Team Science two-session workshop, currently being expanded into a required course for 2021-2022. (See description below)

> "Solving complex societal problems (e.g., global warming, poverty, cancer, health care) requires the integration of specialized knowledge bases. However, as the volume of scientific knowledge has increased over time, it has become increasingly difficult for any single individual to have deep expertise in all needed areas of science. Addressing today’s complex problems requires the high degree of cross-disciplinary collaboration, referred to as "Team Science". This course offers practical guidance about how best to engage in team science to: pursue complex science questions, work effectively with team members, and produce high impact research outcomes that help meet society's needs."

**Dr. Beth Bechky, Professor of Management and Organizations, Seymour Milstein Professor of Ethics and Corporate Governance and Strategy at the Stern School of Business.**

- **Didactic Goals and Objectives:** The goal of this course is to educate trainees to work successfully in teams. In an effort to improve team science teaching, TREC assembled an advisory group with expertise spanning team science, education, mentoring, and evaluation to explore ways to improve the experience. Building on her experience teaching team science in the MBA program, Dr. Bechky enhanced the course by adopting a flipped classroom approach and by emphasizing active, experiential learning strategies (e.g., health care case-based simulations, assignments to critique working research teams). The two-session workshop received high praise from the last cohort (both TL1 and KL2 participants), and she will now expand the course to six sessions. Besides the Team Science course, TREC will devote time in the Student to Scholar (STS) seminar to team building activities such as negotiating authorship and small group activities (e.g., developing criteria to evaluate trainee's presentations).
Outcomes/Measures Used to Determine Success

- **Mixed Methods:** Dr. Bechky will use mixed methods (qualitative and quantitative) for the course assessment, with the former taking the form of written trainee feedback, and the latter consisting of more traditional Likert scale course evaluations. TREC leadership is dedicated to the practice of continuous quality improvement, and will review and react to these interim results to make iterative enhancements to the Team Science curriculum in conjunction with the TREC advisory group.

- **Formative vs. Summative Measures:** Since the Team Science course is still relatively new, most of the measures used to determine success will be formative and process-oriented. The focus will be on collecting participant data on the content and utility of the workshop as we expand it into a full course. Formative data and measures currently being collected are:
  - Would you recommend this workshop to your colleagues? If not, why?
  - Was the content clear and presented in a logical way?
  - Did the instructor provide useful materials and resources?
  - Were there topics you expected, but did not see in the workshop?
  - If yes, please enter the topics that you would have liked to learn about.
  - Was the instructor knowledgeable, insightful and enthusiastic on the workshop topics?
  - Please rate the relevance of this workshop to your training needs.

- **Outcomes Measures Follow Process Measures:** Among professional evaluators, the general consensus on best practices is that tracking outcomes measures is only appropriate after an intervention has stabilized (in this case the added content and workshop-to-course expansion). Initial outcomes measures are already being tested with alumni, by asking participants for concrete feedback: “Please rate the impact of the workshop on your career development.” Other outcomes measures currently under consideration include in-depth interviews and case studies. TREC is also considering implementing quasi-experimental evaluation designs to measure the impact of the Team Science course on the teams that received the training versus previous teams that did not.

Description of Results

- **Attendance and Satisfaction Data:** As described above, the appropriate evaluative approach for this phase of an intervention is formative, with a focus on the use of process data for continuous quality improvement. Therefore, the initial description of results primarily rests on attendance data and satisfaction data (feedback from both students and the teacher).
  - **Participant Attendance Data:** Despite the unprecedented academic interruption of the pandemic, attendance in the most recent Team Science workshop held on April 30, 2021 was good, with ten TL1 (pre- and post-doctoral) and six KL2 (MD and PhD) participants, with a total attendance of 16. Eleven out of the 16 attendees were female, and five were male. The participants' areas of research included Neurology, Biostatistics, Nursing, Biomedical Engineering, Dentistry, Medicine (Infectious Diseases), Pediatrics, Urology, Psychiatry, and Population Health. TREC workshops are typically attended by 30-35 participants and since this particular workshop is by nature extremely interactive, the professor capped the size at 20.
The University of Rochester Center for Leading Innovation and Collaboration (CLIC) is the coordinating center for the Clinical and Translational Science Awards (CTSA) Program, funded by the National Center for Advancing Translational Sciences (NCATS) at the National Institutes of Health (NIH), Grant U24TR002260.

- **Participant Satisfaction Data:** Student Feedback: Initial measures are very encouraging, as exemplified in this quote: "Fantastic workshop... Tools and skills I will use every day. Instructor is highly engaging, thoughtful and very knowledgeable... fortunate to have Professor [Bechky]"

- **Professor Feedback:** Dr. Bechky is also enthusiastic about the expansion from workshop to full course: "The best parts were the discussions around the team science case study and the group breakouts on the problems the students faced in their own work teams. We used a new remote tool for that breakout (the jamboard) which I think I will continue to use in the future if I have to teach remotely... Right now I am thinking about a session on team design, a session on team leadership and decision-making, and possibly sessions on negotiations/difficult conversations and social networks."

**Lessons Learned**

While we are still in the preliminary stages, our immediate sense of “lessons learned” falls into two primary categories: 1) Teams prefer an "intimate" interactive approach; 2) Lessons learned from COVID.

1) **An "Intimate" Challenge Requires an "Intimate" Approach**

   Since the nature of many Team Science challenges is by nature intimate and interactive (difficult power dynamics, credit and authorship struggles, friction from differing modes of collaboration), our primary lesson learned is that a similarly more intimate and interactive course is the "right fit" for the nature of the challenges these junior researchers are/will be addressing as teams.

2) **Lessons Learned from COVID**

   Dr. Bechky had initial reservations about the utility of the remote model given the interactive nature of her course, but both the professor and the trainees managed to rise to the occasion, and the results were promising. As the professor and trainees got accustomed to remote learning, it became a bit less challenging and the group adapted. In addition, it was observed that not all teams will be geo-located in the same area over the course of their careers, and that remote teamwork will also require a specific set of skills critical to the future of Team Science.