



# Peak Performance: A Communications-Based Leadership and Teamwork Simulation for Fourth-Year Medical Students

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Journal of Medical Education and  
Curricular Development  
Volume 7: 1–5  
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DOI: 10.1177/2382120520929990



## ABSTRACT

**BACKGROUND:** Medical education has traditionally been rooted in the teaching of health and disease processes, with little attention to the development of teamwork and leadership competencies.

**OBJECTIVE:** In an era of value-based health care provided by high-functioning teams, new approaches are needed to develop communication, leadership, and teamwork skills for medical students.

**DESIGN:** We designed and piloted a simulation-based educational activity called *Peak Performance* that linked a workbook, which focused on self-reflection on communication and leadership skills, with professional coaching. The simulation scenario placed students in the role of an upper-level resident on an inpatient service, followed by a small group debrief with students, a clinical faculty member, and a professional executive coach. After the debriefing session, students were invited to complete a self-reflection workbook within 1 week of the initial simulation. The final element of the curriculum was an individualized session with an executive coach. *Peak Performance* was offered to all fourth-year medical students enrolled in the Social and Health Systems Science required course at the University of North Carolina School of Medicine.

**RESULTS:** Pre-/post-self-assessments of leadership competencies were completed by students. Pre-simulation self-assessment scores ranged from 3.72 to 4.33 on a 5-point scale. The lowest scores were in “Managing Conflict” and “Managing Others.” The highest score was in “Self-Awareness.” The post-simulation scores decreased in every competency, with “Managing Others” dropping significantly from 3.72 pre-simulation to 3.36 post-simulation (0.31,  $P < .05$ ). Satisfaction with the curriculum was high, as reflected by a Net Promoter Score of 91% (“excellent” > 50%).

**CONCLUSIONS:** A novel simulation-based educational activity linked to professional coaching is a feasible and impactful strategy to develop leadership, communication, and teamwork skills in medical students. Student insight and self-awareness increased as evidenced by a decrease in competency self-assessment after guided reflection and individualized coaching.

**KEYWORDS:** Leadership, teamwork, simulation, medical education

**RECEIVED:** February 11, 2020. **ACCEPTED:** May 4, 2020.

**TYPE:** Original Research

**FUNDING:** The author(s) received no financial support for the research, authorship, and/or publication of this article.

**DECLARATION OF CONFLICTING INTERESTS:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Introduction

A rapidly changing health care environment has been driving the development of medical education curricula that are inclusive of quality improvement, teamwork, and leadership development.<sup>1</sup> Leadership and teamwork competencies are critical to maintaining effective teams that can improve quality, promote health outcomes, and reduce the cost of health care. Although traditional medical education has established approaches to teaching biomedical aspects of health and disease, there is need for educational programs and activities that can effectively develop competencies in teamwork and leadership.<sup>2</sup>

Prior leadership initiatives in medical education have focused on skills such as team building and interpersonal dynamics,<sup>3</sup> and a systematic review of leadership programs questioned if existing approaches effectively teach the skills that medical students and residents will need.<sup>4</sup> For example, most educational strategies focus on self-assessed knowledge and expertise despite evidence that supports repetitive practice through high-quality simulation.<sup>5</sup> However, these studies do not evaluate longitudinal experiences applying leadership principles.

To address the learning needs of medical students in developing leadership and teamwork competencies, we designed and piloted a simulation called *Peak Performance* that was linked



with self-reflection and debriefing exercises led by professional coaches and clinical faculty. We describe this educational innovation and provide a formative evaluation of the activity.

## Methods

### *Setting and participants*

*Peak Performance* was developed as part of the Translational Education at Carolina (TEC) curriculum at the University of North Carolina School of Medicine (UNCSOM). TEC focuses on integrating basic sciences and clinical skills, providing longitudinal patient care experiences, and offering earlier clinical opportunities in specialty fields. As part of TEC, Social and Health Systems (SHS) coursework provides grounding in the social environments and health systems that are part of medicine and health care. *Peak Performance* was piloted in SHS 5, a required fourth-year course that focuses on principles related to patient care, approaches to the organization, financing and delivery of health care, and identifying the role of physicians in implementing health policy. Participants of our study were 18 fourth-year medical students enrolled in SHS 5 in October 2017.

### *Program development and description*

*Peak Performance* was developed by faculty and staff from the UNC SOM (S.S., T.P.D.) and the UNC Kenan-Flagler Business School (KFBS) (M.S.). The activity was structured to develop the competencies of self-awareness, communication, collaboration, openness, managing conflict, and managing others in an experiential learning process. Designed according to Social Cognitive Theory,<sup>6</sup> *Peak Performance* allowed learners to self-regulate their learning by drawing on a real-world scenario that required timely, effective communication, best actions, planned behaviors, and progress toward their communication goals.

The learning experience began with the simulation of a typical day for an upper-level resident who was leading and managing an inpatient clinical service. A hard copy script described this context and then provided a series of communication prompts from interns, attending physicians, fellowship directors, nursing staff, medical students, and family members that needed to be addressed in real time. Students were asked to respond to 23 text messages, emails, voice messages, and pages via a computer-based answer sheet in a 60-minute time frame.

After completing this exercise, students participated in small group debriefing session with clinical faculty and a professional coach. Professional coaches were drawn from the Kenan-Flagler Business School Executive Coaching Program and had a basic understanding of the health care environment. Clinical faculty selected based on their teaching and leadership experience served as the health care experts to assist the professional coaches. The debriefing session focused on several elements: how students set priorities and why; students' natural strengths and challenges;

the role of and strategies for giving feedback; and pros and cons of different modes of communication.

Following the debriefing session, students were offered a reflection workbook that focused on helping them identify and objectively evaluate their strengths and areas of development. The workbook outlined suggested responses and teaching points for all 23 messages in the simulation, and prompted students to reflect on strategies for development of their communication skills. A reflection exercise guided students in exploration of their core values of empathy, integrity, and respect and culminated in an exercise prompting them to consolidate their insights into an actionable plan, called the Personal Development Plan.

If students completed the workbook, they were offered an additional personalized session with a professional coach. The coaching session was an hour-long individualized meeting that focused on communication skills, using the reflection workbook as the foundation. This session provided students with an opportunity to expand their Personal Development Plans and further explore the thoughts, questions, and concerns raised in both the simulation and the reflection workbook. It also provided an opportunity for students to set future goals with the help of a professional coach.

### *Program evaluation*

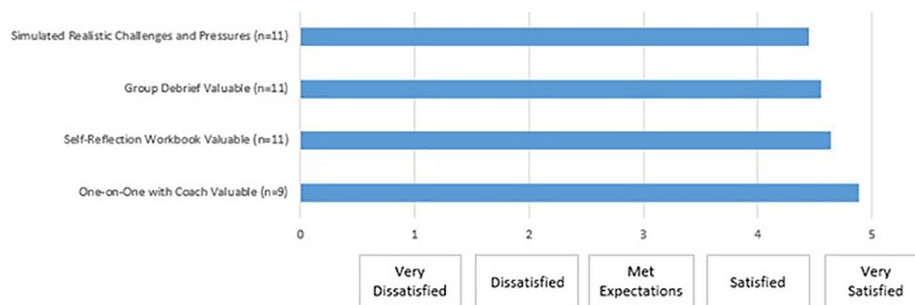
We used a pre-/post-survey design and data from the reflection workbooks to guide a formative evaluation of *Peak Performance*. We distributed a pre-activity survey electronically at the beginning of the SHS 5 course, with self-reported items that gauged competencies in self-awareness, communication, collaboration, openness, managing conflict, and managing others. At the end of the reflection workbook, post-simulation, students were asked again to self-assess in the competencies. At the conclusion of the 4-week rotation, we distributed post-surveys electronically with quantitative and qualitative questions about student satisfaction and experiences with the simulation. Students were asked if the experience simulated realistic challenges as well as the value of the debriefing session, reflection workbook, and one-on-one coaching. These items were assessed on a 5-point Likert-type scale where 1 = very dissatisfied and 5 = very satisfied. An open text box asked for any additional feedback; narrative comments were reviewed to identify commonly occurring comments. The pre- and post-self-assessments used a 5-point Likert-type scale where 1 = not demonstrated to 5 = well demonstrated. Scaled items were compared using Wilcoxon signed rank test using IBM SPSS version 25.

We used the Net Promoter Score (NPS) to gauge the level of overall satisfaction with the simulation activity. The NPS is a marketing industry index that assesses how likely customers are to recommend a brand or product to others (scale 1-10).<sup>7</sup> In *Peak Performance*, students were asked, "How likely is it that you would recommend this experience to your classmates to

**Table 1.** Student Self-Assessments Before and After Peak Performance Activity.

CATEGORY	PRE-SIMULATION (N = 18)	POST-SIMULATION (N = 14)	P VALUE
Self-awareness	4.33	4.14	.309
Communication	4.00	3.71	.199
Collaboration	3.94	3.79	.295
Openness	4.28	4.21	.578
Managing conflict	3.72	3.43	.063
Managing others	3.72	3.36	.031*

\*Significant at a level of  $P < .05$ .

**Figure 1.** Participant Satisfaction in Peak Performance Activity.

further enhance their leadership development? (1 = Not at all Likely, 10 = Extremely Likely).” Respondents answering in the 9 to 10 range are “promoters,” respondents answering in the 0 to 6 range are “detractors,” and respondents answering in the 7 to 8 range are “passives.” The percentage of detractors is subtracted from the percentage of promoters, leaving the NPS, which ranges from -100 (all detractors) to 100 (all promoter).<sup>7</sup> A score above 50% is generally deemed “excellent.”<sup>8</sup> For reference, in October 2017, the NPS of the Apple iPhone was 55%.<sup>9</sup>

This assessment was designed for initial curricular assessment of a pilot program; therefore, study participant characteristics were not collected. The UNC Institutional Review Board reviewed this study and designated it exempt (IRB No. 18-1143).

## Results

The pre-simulation survey response rate was 100% (18/18). Fourteen of the 18 (74%) students elected to complete the reflection workbook, allowing for collection of post-self-assessment of competencies in these students (Table 1). The end-of-rotation survey was completed by 11 of 18 (61%) students.

Pre-simulation self-assessment scores ranged from 3.72 to 4.33 on a 5-point scale. The lowest scores were in “Managing Conflict” and “Managing Others.” The highest score was in “Self-Awareness.” The post-simulation scores decreased in every competency, with “Managing Others” dropping significantly from 3.72 pre-simulation to 3.36 post-simulation (0.31,  $P < .05$ ).

One hundred percent of respondents were satisfied or very satisfied with the realistic nature of the simulation. Ninety-one

percent of students found value in the debriefing session. Likewise, 91% of students were satisfied or very satisfied with the self-reflection workbook. Among the group debriefing session, reflection workbook, and one-on-one coaching session, students found the one-on-one coaching most valuable (Figure 1) with 100% (n = 9) endorsing being satisfied or very satisfied with the one-on-one coaching. Specifically, 89% of respondents were very satisfied with one-on-one coaching. The NPS for Peak Performance was 91%, indicating a very high level of overall satisfaction with the simulation.

The free-text responses (n = 7) supported the quantitative feedback. Multiple respondents characterized the program as “excellent” and expressed that it should be expanded and/or offered to all medical students. Students identified the content as filling an existing gap in their medical education. Three respondents commented on the relevance of the content to their upcoming roles as residents and emphasized the value it provided to their education. Students praised the simulation as a great vehicle for developing communication skills, and 1 student characterized this type of training in communication “essential” to success in residency. Four of the 7 students specifically commented on the value of the one-on-one meetings with the executive coaches and referred to gaining insight into their own strengths via the coaching sessions.

## Discussion

This pilot study demonstrated the feasibility of our approach using a simulation followed by a debriefing session, reflection workbook, and individualized session using professional

coaches. Most notably, self-assessment scores decreased universally in the focused competencies post-simulation, with the most significant change being in “managing others.” This reflects recommendations by Eva and Regehr that accurate self-assessment requires external input from coaches or peers to accurately self-assess.<sup>10</sup> Therefore, students overestimated their leadership and communication abilities, perhaps due to a lack of training and education in these domains. Yet after multiple feedback opportunities and individualized coaching, their self-assessments more accurately reflected their abilities. There was no statistical significance in all competencies; however, the sample size was small. Given the emphasis on team management in the simulation, it is logical that the “managing others” competency demonstrated the only statistically significant change. “Managing others” is an area that we felt there to be a global level of unpreparedness, as there is no specific medical curriculum that addresses how to work with and manage others—in any setting.

The overall satisfaction with the simulation was high, with students being very satisfied with the more individualized content (ie, one-on-one coaching session). They felt the scenarios were realistic based on their limited clinical experience. Although not commonly used in medical education literature, the result of the NPS was particularly striking. As a measure of student satisfaction in a population known to be critical of curricular innovations that deviate from their usual experiences, an NPS of 91% was exceptional. Considering a business industry reference of >50% as “excellent,” the score for *Peak Performance* indicates an extremely high degree of satisfaction across the group. This was borne out in the narrative feedback, as well. There was no metric for behavior change in this small study; however, the multiple narrative references to an increase in personal insight via the simulation, workbook, and coaching imply educational impact and professional growth. The combination of realistic scenarios, self-assessment, and coaching created a rich context in which leadership and teamwork skills were effectively cultivated and broadened.

This unique educational experience was a collaborative development between our medical school and business school, with the overall goal of integrating the knowledge and skills from both disciplines. The importance of leadership and teamwork building programs has been demonstrated in past publications, some demonstrating a direct correlation between improved teamwork leading to improved patient outcomes.<sup>11</sup> Similarly, Cornthwaite et al<sup>12</sup> asserted that the lives of mothers and babies can be preserved by investing in realistic, evidence-based, repetitive, interprofessional obstetric simulation that improves teamwork and leadership skills. We believe our simulation adds to this body of work by creating content that directly impacts leadership and teamwork skills through self-reflection and team management, with significant impact via executive coaching that further enhanced the learner’s experience. Creating and implementing a high-quality, realistic

simulation curriculum focused on leadership and teamwork for upper level medical students fills an identified gap in medical education programs that are insufficient in preparing learners for team-based care delivery as residents and emerging physicians.<sup>13</sup> Curricula like *Peak Performance* have the potential to further promote patient safety in comprehensive medical education programs.

Our study model had several limitations. The program was resource intensive and required funding, facilitators, executive coaches, and attending physicians with the experience to facilitate the debriefing sessions. In addition, the program encompassed a significant amount of collaboration with our business school—which could be difficult for other institutions depending on the university programs available. However, the existing *Peak Performance* curriculum is portable to other institutions and could be delivered with faculty trained in coaching techniques. We are currently developing a faculty-coach training model to support professional development of faculty and create a sustainable model for *Peak Performance* in our institution.

Another limitation of the study was the small sample size. As a pilot, *Peak Performance* was designed as a model upon which to iterate based on student feedback. We hypothesize that this small sample size accounts for the statistically significant change in only a single competency and expect that a larger sample (currently underway) will yield more competencies with significant changes pre- and post-simulation. A strength of the sample is that the course is required, reducing the likelihood of selection bias in the initial cohort. However, continuation on to the workbook and one-on-one coaching was voluntary, increasing the likelihood of selection bias as our sample narrowed. It is reasonable to expect that students with more advanced leadership and communication skills may have been more likely to continue with the workbook and coaching than their peers who struggle with communication competencies. This may have positively influenced the satisfaction outcomes and reduced the impact of pre- and post-survey assessments (students starting with well-developed competencies may have noted less before and after difference in their self-assessed skill levels).

Future work includes further study of the *Peak Performance* curriculum, including its impact on behavior change in learners. With increasing numbers of students, we endeavor to distinguish which elements of the curriculum offer the most benefit (simulation, debrief, and/or coaching). In addition, we are studying the addition of a gamified micro-course (an “app”) that is easily accessible to students asynchronously on their smart phones and extends their learning via the simulation scenarios across their SHS5 block. In the future, we would like to expand the program to encompass graduate medical education trainees, faculty, and other health professionals, such as graduate-level nursing students. In time, we hope to incorporate simulated exercises involving standardized patients.

## Conclusions

Leadership and teamwork competencies are key to creating effective physicians and teams with the capacity to improve quality, enhance outcomes, and reduce health care costs. There is increasing need to develop programs at the undergraduate medical education level to address these competencies. The *Peak Performance* program is a high-fidelity simulation focused on impacting medical students' competency in self-awareness, communication, collaboration, openness, managing conflict, and managing others. As we move forward in the ever-changing landscape of medical education, student engagement in simulations addressing these types of competencies will be essential in adequately preparing students for residency and beyond.

## Authors' Note

We presented an earlier version of the manuscript as a poster at the American Medical Association Accelerating Change in Medical Education Consortium spring meeting in Providence, RI, in April 2018.

## Acknowledgements

We thank the Eddie C. Smith Jr. Leadership Initiative for supporting the Peak Performance pilot. In addition, this work was developed as part of the American Medical Association Accelerating Change in Medical Education Consortium. The funders had no role in curriculum design, data collection, or the preparation of this manuscript.


## Author Contributions

SS, MS, and TPD developed the Peak Performance simulation. S.S. was the primary author. LTD and AV offered ongoing revisions to the Peak Performance simulation and the manuscript. GBD performed statistical analysis and significant revisions to

the original manuscript. JC, MS, and TPD were co-authors and also offered manuscript revisions. All authors reviewed the final manuscript.

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## REFERENCES

- Gonzalo JD, Dekhtyar M, Starr SR. Health systems science curricula in undergraduate medical education: identifying and defining a potential curricular framework. *Acad Med.* 2018;93:123-131.
- Arnold L, Cuddy PG, Hathaway SB, Quaintance JL, Kanter SL. Medical school factors that prepare students to become leaders in medicine. *Acad Med.* 2018;93:274-282.
- Sklar DP. Leadership in academic medicine: purpose, people, and programs. *Acad Med.* 2018;93:145-148.
- Frich JC, Brewster AL, Cherlin EJ, Bradley EH. Leadership development programs for physicians: a systematic review. *J Gen Intern Med.* 2015;30:656-674.
- McGaghie WC, Issenberg SB, Petrusa ER, Scalese RJ. Effect of practice on standardised learning outcomes in simulation-based medical education. *Med Educ.* 2006;40:792-797.
- Zimmerman BJ. Dimensions of academic self-regulation: a conceptual framework for education. In: Schunk DH, Zimmerman BJ, eds. *Self-Regulation of Learning and Performance: Issues and Educational Applications*. Hillsdale, NJ: Erlbaum; 1994:3-21.
- Net Promoter Network*. What Is Net Promoter? <https://www.netpromoter.com/know/>. Accessed November 11, 2018.
- Answering the Ultimate Question: What's a Good NPS Score?* <https://www.promoter.io/blog/good-net-promoter-score/>. Accessed March 16, 2019.
- NPS Benchmarks: Apple iPhone*. [https://npsbenchmarks.com/companies/apple\\_iphone](https://npsbenchmarks.com/companies/apple_iphone). Accessed March 16, 2019.
- Eva KW, Regehr G. "I'll never play professional football" and other fallacies of self-assessment. *J Contin Educ Health Prof.* 2008;28:14-19.
- Weller J, Boyd M, Cumin D. Teams, tribes and patient safety: overcoming barriers to effective teamwork in healthcare. *Postgrad Med J.* 2014;90:149-154.
- Cornthwaite K, Edwards S, Siassakos D. Reducing risk in maternity by optimising teamwork and leadership: an evidence-based approach to save mothers and babies. *Best Pract Res Clin Obstet Gynaecol.* 2013;27:571-581.
- Webb AM, Tsipis NE, McClellan TR, et al. A first step toward understanding best practices in leadership training in undergraduate medical education: a systematic review. *Acad Med.* 2014;89:1563-1570.