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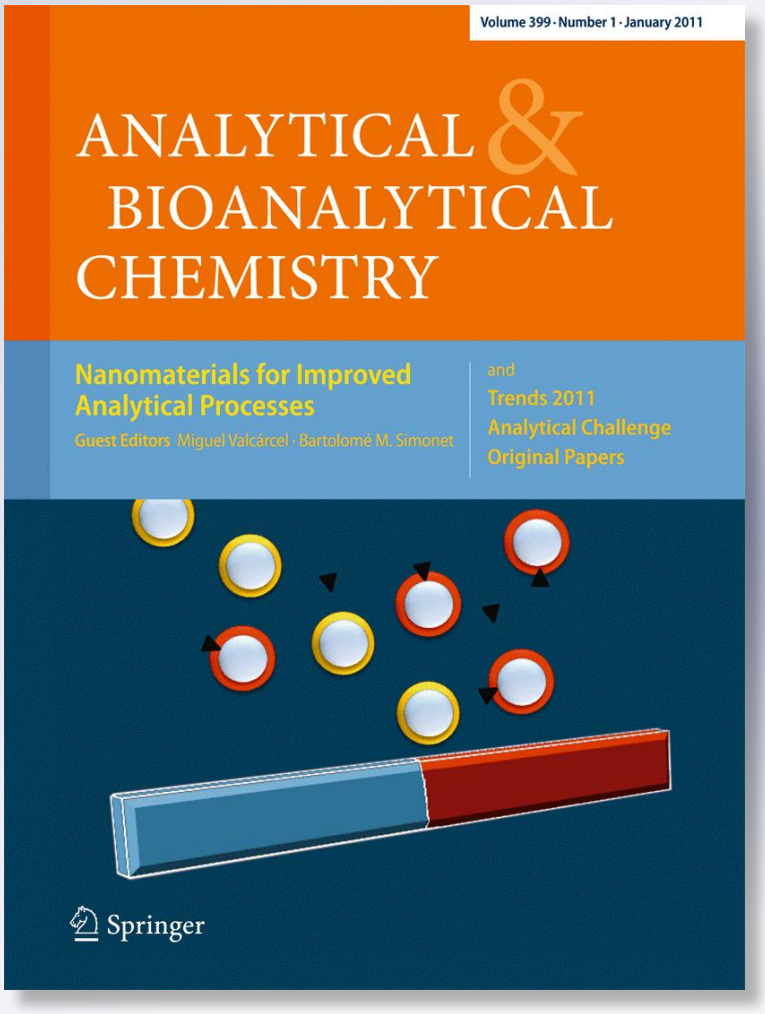

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BUILDING A PROFESSIONAL CAREER

The sporting nature of science

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There are some intriguing analogies that can be drawn between sports and science. Both are very competitive and require a set of skills that take time to learn, practice, and master. Both involve some degree of experimentation and risk-taking by both the coach and the players. In science as in sports, the battle can be exhausting. But the wins make it easy to forget the often intellectual and physical exhaustion required in the effort.

The role of the coach

The coach can have a significant influence on the outcome of its team, whether the team be decked-out in pads and helmets, or a lab coat and goggles. The role of a coach in both cases is to work with players to teach them necessary skills while also providing guidance and encouragement during the practice and implementation of these skills. Success as a team, whether in science or sports, is maximized when the coach provides the opportunity for all team members to achieve their full potential.

Competitive sports has its share of good and bad coaches. How does one distinguish between the two? For the avid fan of professional sports, the distinction can be ruthlessly black and white, more wins than losses. For the parent with the son or daughter on the playground, or the high school or collegiate field, the metrics for judging the quality of the coach can be very different and often more subjective, a reflection of the mentoring role that a coach also plays in the lives of the emerging adult.

Competitive science also has its share of good and bad coaches in the role of research advisor, teacher and research administrator. As a scientific community, we have metrics for evaluating individuals on their scientific productivity—but not for evaluating whether a scientist is a good coach or departmental leader. In sports, there are a multitude of schools and camps to teach how to be a good coach and athletic leader. In science, that learning experience is almost exclusively in technical skills development, leaving many scientists in their first coaching jobs nearly clueless about effective personnel management and the types of leadership skills that can assist them in maximizing the success of their students and operations in their departments.

Attributes of a good coach in sports or science

Leadership style in science, as in sports, plays an important role in the productivity of the team as well as the career development of its team members. Whereas an autocratic style of leadership can be effective in military situations and on the sports field, it is often less effective in many academic and industrial laboratories. In the research setting, a good leadership style is one that promotes a workplace where professional discourse is valued over locker room behavior. The advisor–mentor–coach that encourages positive and respectful discourse in decision making processes sets a professional tone in the workplace that can significantly enhance the scientific productivity in the laboratory. The unfortunate consequence of the alternative is that it can turn away the best and brightest from pursuing careers in technical fields and for reasons that have nothing to do with the students' scientific capabilities.

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Learning to be an effective coach in science and engineering

Some scientists and engineers are "natural born leaders". They can provide a clear vision, can be in control without being controlling, and can inspire individuals to perform beyond their own expectations. Others, however, would greatly benefit from learning professional techniques to make them more effective in running a research group, a department or a research institute. Training in effective leadership styles, professional discourse, consensus building and negotiation tactics are routinely taught in our business and management departments, but for whatever reason, rarely make it to our science and engineering parts of campus. Even training in how to be a more effective teacher in a technical classroom is either not available or considered only important for those whose teaching evaluations go sub-zero.

As we reflect on the educational experience that we provide to our students and colleagues at all levels in higher education, we must ask ourselves if we are providing them with a full "sports bag" of tools for success in science and engineering today. While they diligently hone their skills in data taking and analysis, equipment trouble shooting, and reading and writing scientific literature, are they also learning and practicing the type of team and leadership skills that will allow them to successfully ascend the career ladder? There are a number of avenues for augmenting the scientific education with professional communication and leadership skills training. Crossing the campus or workplace to your management or business school to discuss such joint educational ventures is one possibility recently adopted by several campuses.

COACh efforts

Over the past decade I have had the pleasure of working with an organization called "COACh" that has been developing and offering workshops on such topics across the country (http://coach.uoregon.edu). The motivation behind the initial workshops we developed was to provide a forum for women scientists to meet, network and provide mutual support while learning negotiation and communication techniques to help them advance their careers. Little did we know when we started this venture how important these workshops would become for the whole scientific enterprise, not just for women chemists, and not just for women.

Since those early efforts, COACh workshops have grown to encompass a wide variety of professional skills development topics including effective leadership, persuasive communication and negotiation, leading organizational change, consensus building, setting priorities, and work–life balance issues. Coincident with these expanded offerings has been the exponential growth in attendance, from the 12 women chemists in the initial workshop, to nearly 5,000 graduate students, postdocs, faculty, and administrators from all science and engineering disciplines. These workshops have been held at over 60 colleges and universities, at numerous companies, and at professional meetings including the American Chemical Society, American Physical Society, the Society for Industrial and Applied Mathematics, National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, Society for the Advancement of Chicanos and Native Americans in Science, American Geophysical Union, International Combustion Institute, American Society for Microbiology and Council for Chemical Research. In these workshops, the professional facilitators use case studies, theater, role-playing and lively debate to enhance the learning experience of the 15–20 participants in each session. Key to the initial development and implementation of our workshops has been the financial support of several federal funding agencies and private sources including the Dreyfus Foundation, the Basic Energy Sciences of the Department of Energy, the National Institutes of Health, and the National Science Foundation.

Why are these workshops so effective and popular? Answers can be found in the extensive research that COACh has conducted on attendees before and after participation in the workshops [1]. First, it is clear that the workshops are filling a void that currently exists in our traditional training of scientists and engineers. As far as how the workshops have enhanced the careers of participants, the most common examples cited include enhanced teaching effectiveness, increased research productivity, improved negotiation skills for increasing compensation and laboratory resources, increased recognition for their accomplishments including career promotions, improved interactions with students and colleagues, motivation to take on more leadership responsibilities, overall satisfaction in the workplace. Nearly 90% of the participants report that the skills that they have learned reduced their workplace stress. Over 85% state that they have used what they learned to coach others in the strategies learned.

Although initially tailored for women, as male scientists and engineers have seen the benefits of such training in their female colleagues, they have increasingly participated. The largest recent increase has been at the postdoc and graduate student level. Ph.D. student participants are coached in similar skills as in the faculty workshops, but with scenarios more pertinent to their experience. How to negotiate for time on equipment, authorship on a paper, travel to professional meetings,

timetable for completion of a degree, employment packages, personal time for family needs—are a few of the topics chosen for discussion by these younger participants. We have also conducted workshops for those students and faculty of color that see value in discussing their issues with others that have similar experiences. Such workshops illuminate the striking differences in the lives and challenges that these individuals face relative to their majority counterparts.

For both science and sports, success depends on the performance of its players and coaches. With the scientific and technical challenges that lie ahead of us in medicine, technology, and the global environment, we cannot afford to waste the talents of the science team, our technical workforce. Instead we must look for ways to maximize each individual's performance in whatever way we can. Filling up their scientific toolbox with skills that take them beyond the traditional education of our disciplines is one way to do that. This is not just warm and fuzzy stuff—it is an effective business model that scientists can easily learn and adopt to make them better players, coaches, and scientists.

Reference

1. COACh Career Development Workshops for Science Faculty: Views of the Career Impact on Women Chemists and Chemical Engineers, J. Greene, P. Lewis, G.L. Richmond and J. Stockard, *J. Chem. Ed.,* 87 (386–391) 2010

Geraldine Richmond is the Richard M. and Patricia H. Noyes Professor in Chemistry at the University of Oregon. Her research team uses nonlinear optical spectroscopy and computational methods to understand the chemistry and physics that occurs at complex surfaces and interfaces that have relevance to important problems in energy production, environmental remediation, atmospheric chemistry and biomolecular surfaces (http://richmondscience.uoregon.edu). She is equally active in issues of science literacy and the recruitment and retention of underrepresented groups in science and engineering. In 1998, she started COACh and currently serves as its Director.