POINT/COUNTERPOINT

Suggestions for topics suitable for these Point/Counterpoint debates should be addressed to Colin G. Orton, Professor Emeritus, Wayne State University, Detroit: ortonc@wayne.edu. Persons participating in Point/Counterpoint discussions are selected for their knowledge and communicative skill. Their positions for or against a proposition may or may not reflect their personal opinions or the positions of their employers.

Subjects such as strategic planning, extra-disciplinary communication, and management have become crucial to medical physics clinical practice and should become an integral part of the medical physics curriculum

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OVERVIEW

In addition to their clinical duties, many medical physicists find themselves in a situation where they have to do managerial work such as strategic planning and communication within a hospital or with outside agencies. Typically, these skills are obtained on-the-job or by taking extra-curricular courses. However, some believe that such strategic planning and communication and management skills are so important that courses on these topics should become an integral part of the medical physics curriculum. This is the claim debated in this month's Point/Counterpoint.

Arguing for the Proposition is Carmel J. Caruana, Ph.D. Dr. Caruana has a B.Sc. in Physics and Mathematics and a PGCE from the University of Malta, an M.Sc. in Applied Radiation Physics from the University of Birmingham, U.K., and a Ph.D. from Charles University, Prague. He is Associate Professor and Head of the Medical Physics Department, Faculty of Health Sciences, University of Malta. Dr. Caruana specializes in diagnostic and interventional radiology, protection from ionizing radiation and other physical agents, and legislative/professional/education and training (E&T) issues in Medical Physics. He is past Chairperson of the E&T Committee of the European Federation of Organizations for Medical Physics and main author of the "Role" and "Education & Training" chapters of the EU sponsored document "European Guidelines on the Medical Physics Expert." He is also the main author of the leadership in Medical Physics module of the EUTEMPE-RX project entitled "Leadership in Medical Physics: Development of the profession and the challenges for the Medical Physics Expert (D&IR)."

Dr. Cunha received a Ph.D. in experimental particle physics from the University of California, Santa Barbara in 2006. He continued his experimental particle physics research with a postdoctoral position at the Brookhaven National Laboratory in New York working on code development for the ATLAS detector. In 2009, he moved to the University of California San Francisco, where he is currently working as an Assistant Professor in the Department of Radiation Oncology. His current research focus is on technological improvements for brachytherapy including dose optimization, robotics, additive manufacturing, and electromagnetic tracking. He has a strong interest in education and currently serves as the Vice Chair of the UCSF Academic Senate's Graduate Council. Dr. Cunha has served as President of the San Francisco Bay Area Chapter of the AAPM and is active on several AAPM committees including as Chairman of the Working Group on Medical Physics Graduate Education Program Curriculum.

FOR THE PROPOSITION: Carmel J. Caruana, Ph.D.

Opening Statement

The clinical and wider economic and societal environment within which medical physicists exercise their profession has changed radically over the last years; indeed change is unrelenting and the ground seems to be constantly shifting under our feet.[1,2] there was a time when being a good scientist was sufficient to thrive within the hospital environment; a time when good physicists were considered essential for the running and ongoing development of a quality clinical service. This is not true in general anymore; economic pressures and intra- and inter-professional turf wars now dominate many of our workplaces and have turned large hospitals into gargantuan malls selling health services. In such circumstances, the quality and safety values so dear to our profession are diluted as the profit motive dominates. For example, in diagnostic radiology reduction of population doses and the emphasis on diagnostic accuracy via high image quality tend to be looked upon as less important (read 'an unnecessary expense') provided they do not reach critical values detectable by patients or society at large (hence affecting profits). As we strive within this new milieu to reposition our profession, departments, and often our personal selves, ongoing formal, informal and instinctive professional, departmental and personal strategic planning via strengths, weaknesses, opportunities, and threats (SWOT) audits have become the order of the day.[3,4] All healthcare professions are feeling the heat and the number of MBA programs with a specialization in healthcare management (all of which include a heavy dose of SWOT-based strategic planning) has mushroomed.

For many of us who were brought up in a world in which scientific excellence was our mantra, this has been a culturally shocking experience and it is even more bewildering to the unsuspecting physics graduate who transfers from the relatively 'safe' confines of a university physics department to the new economic-political healthcare minefield. It is therefore our duty as leaders and educators to acknowledge the new norm, negotiate a personal adaptation which does not compromise our core values, and prepare our students and trainees both academically and psychologically to perform well in such an alien environment based on a paradigm so distant from our scientific ethos. This training for the 'real world' out there, needs to be planned, structured, inbuilt into the curriculum, and start early since the 'real-world maturity' required to hold one's own in such an environment, cannot be acquired overnight. In particular, it requires a program to build up the psychology of our trainees and turn them into strong leaders. It is imperative that we introduce elements of strategic planning, medical sociology, management, leadership, economics, communication, office politics, and policy making into our curricula. In addition, the gradual elimination of the humanistic approach to healthcare and its replacement by a marketing paradigm lifted directly from the commercial world, has made a good knowledge of medical and professional ethics critical. We must help our trainees to adapt to the new order also through ongoing discussions with more experienced mentors based on real-world case studies and issues. I give examples of these in a Medical Physics leadership course I deliver which specifically targets these issues (in fact it is a 'mini-MBA' for medical physicists).[5,6] We, as educators, must not shy away from this responsibility even if it requires a rethink of our own personal world-view and educational philosophy — the future professional success and personal happiness of our trainees depends on it.

AGAINST THE PROPOSITION: J. Adam M. Cunha, Ph.D.

Opening Statement

The proposition is comprised of three components: (a) the topics of study: *strategic planning, communication, and management*; (b) the claim of importance: "*. . .have become crucial. . .*"; and (c) the solution: "*. . .should become integral. . .*." The most contentious is the claim of importance.

As well established in the literature of education, communication skills in STEM fields (or in any career path) are highly correlated with career success. But while strategic planning and management may be beneficial skills for medical physicists, it is not clear these are *crucial skills* to have *upon graduating from a medical physics program*.

Early career positions do not involve management or strategic planning. The usual path for employment after graduation is as a junior medical physicist at a medical facility or in industry. A job including project management, let alone strategic planning, is not likely. And for large departments, it is absolutely feasible that these skills will never be necessary for a career medical physicist. Why should we teach these skills when there will be ample opportunities to acquire them after graduation as may be needed?

Jack of all trades; master of none. Technological advancement is always accelerating; therefore, medical physics programs must continuously evolve to incorporate new material. However, this cannot come at the expense of core medical physics coursework. Didactic training in many degree-granting programs entails two years of course work; and certificate programs, considerably less. The AAPM Reports 197 and 197S outline the *bare minimum* of topics that should be covered to ensure graduates have a core of medical physics knowledge, with the expectation that this minimum is supplemented by auxiliary course work to broaden or deepen students' didactic medical physics training.

It may be tempting to include strategic planning and management education to broaden our students' knowledge. Unfortunately, we play a zero-sum game with time: every addition requires a deletion. Do we want medical physics programs prolonged to accommodate more coursework? Possibly. But constantly advancing technology already causes a struggle to cover an expanded core of basic knowledge. In a choice between teaching new technologies

or teaching management skills, I choose physics every time.

While communication skills are crucial to success in almost *every* occupation (medical physics or otherwise), communication training should be a constant, intrinsic, integral, and organic part of every academic curriculum, not necessarily a distinct course. Management skills and strategic planning, however, are *not* crucial for new graduates of medical physics programs; thus, they should not become integral parts of the medical physics curriculum.

While each program should evaluate the needs of their distinct student base, there is no demonstrable *need* for organizations such as AAPM and CAMPEP to advise or require inclusion of management and strategic planning. Nevertheless, each program must weigh allocating limited time and resources to additional physics courses, *or* to additional clinical experience, *or* to managerial/planning education; they cannot do it all. A strong core of didactic physics courses is paramount. Students would not benefit from learning ancillary subjects at the expense of quality physics training.

Rebuttal: Carmel J. Caruana Ph.D.

I will focus on what I consider to be the strongest arguments of my opponent.

"*Early career positions do not involve management or strategic planning*": While formally this is true, in practice it is not. Today, young people are very job-oriented and the following questions are on their mind: "What shall I specialize/subspecialize in to ensure a good future for myself? What parts of the medical physicist's role will become obsolete? Conversely, what new techniques will become essential?"

"Why should we teach these skills when there will be ample opportunities to acquire them after graduation as may be needed?" Unfortunately, learning these skills when they become needed is invariably too late and the damage done. Strategic planning requires quality thinking time, a change of perspective and a strengthening of personal psychology — that takes time.

"Students would not benefit from learning ancillary subjects at the expense of quality physics training." I, of course, agree, but this need not be the case. Although our students can learn a lot of physics on their own as needed (having had a lot of experience in their undergraduate years), they have had little experience in these ancillary subjects. These skills are being taught to other healthcare professionals; if we defer to a later stage catching up will be difficult.

In essence, a vast amount of physics knowledge will be of little use if you end up without a job.

Rebuttal: J. Adam M. Cunha, Ph.D.

Change is inevitable; core science skills need to remain our focus; auxiliary training can be obtained as needed post hoc.

The younger generation is well connected and in touch. While constant change in our profession may seem "culturally shocking" to us in the old guard, for our students change is the norm. We must not project our generational experience onto our students; they are adept at operating in complex organizations.

Medical physics educators are responsible for teaching students the core skills of a scientist. Admittedly, our students need to learn how to function effectively within the larger healthcare milieu. However, are medical physics faculty the best teachers of management? Should the finite resources we have to teach science be diluted by allocating funds and time to teaching peripheral skills?

Dr. Caruana referenced Dr. Mills' comments[2] about the changing nature of the medical profession — insights obtained while earning a Ph.D. in Health Management. Students interested in health management *should* pursue such a degree. Dr. Caruana inadvertently argues this point when he states: "*the number of MBA programs with a specialization in healthcare management… has mushroomed*." Our universities already have management classes taught by professional business educators. Is it not more efficient and productive to encourage students to pursue these subjects through other departments to the extent they are interested and motivated?

The optimum response to the potential need for strategic planning and management expertise in our profession is to: (a) leave the physics core intact, ensuring that our students have the rigor and confidence to argue the science in the face of bureaucracy; and, (b) allow/encourage interested students to take existing management coursework. A joint degree program, e.g. MS(PhD)/MBA/MPH, created by partnering with the business school within the university, could be an option offered to students willing to extend their tenure and pay the additional tuition. But extending the length/cost of our core programs to meet the needs of the interested few is misguided.

CONFLICTS OF INTEREST

The authors have no relevant conflicts of interest to disclose.

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