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Educating physicians for the future: Carnegie's calls for reform

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Abstract

In both 1910 and 2010, The Carnegie Foundation for the Advancement of Teaching used existing educational innovations and learning theory to point the way to the future of medical education. Flexner's transformative report of 1910 was strongly influenced by the innovative curriculum at Johns Hopkins University School of Medicine and by educational principles of the Progressive Era. In 1912, Flexner wrote a similar critique of medical education in Europe. These two reports have powerfully shaped medical education for the past century. Yet much has changed since then, which prompted The Carnegie Foundation for the Advancement of Teaching to commission another report that was published in 2010. Drawing on contemporary educational innovations and research from the learning sciences, the authors make four recommendations for reform: (1) standardize on learning outcomes while individualizing the learning process, (2) integrate formal knowledge with clinical experience, (3) imbue habits of inquiry and improvement to achieve lifelong learning and excellence, and (4) explicitly cultivate the formation of professional identity. In this article, the author describes educational innovations and educational principles relevant to each of these four recommendations.

Introduction

In 1910, Abraham Flexner, commissioned by The Carnegie Foundation for the Advancement of Teaching, site visited every medical school in North America. He did so with a specific evaluation template in mind – the innovative MD program at Johns Hopkins Hospital and Medical School and the principles articulated by progressive era educational theorists. In 2010, The Carnegie Foundation for the Advancement of Teaching published *Educating Physicians: A Call for Reform of Medical School and Residency* (Cooke et al. 2010) which describes the current state of medical student and resident education in the US. Both these works call for major reforms of how physicians are educated based upon their site visits and reviews of educational research and theory.

Flexner, a school master and not a physician, was hired by The Carnegie Foundation for the Advancement of Teaching at the behest of the Council on Medical Education of the American Medical Association to conduct an independent site visit of all 155 medical schools in the United States and Canada in 1909–1910. Drawing upon the writings of Dewey (1900) and other progressive era educators and the scientifically imbued model of medical education at Johns Hopkins, he argued that medical education should actively engage students in laboratory and clinical learning; and medical schools should be located within universities, have their own teaching hospitals and full-time faculty, have high admission standards, and provide a rigorous curriculum containing 2 years of basic science and 2 years of clinical experience. His report, *Medical Education of the United States and Canada: A Report to The Carnegie Foundation for the Advancement of Teaching* (Flexner 1910), documented the poor quality of

Practice points

- Standardize on learning outcomes while individualizing the learning process
- Integrate formal knowledge with clinical experience
- Imbue habits of inquiry and improvement to achieve lifelong learning and excellence
- Explicitly cultivate the formation of professional identity

many medical schools, creating a firestorm in the press which subsequently led to the closure of one third of the substandard proprietary medical schools.

Following this report, Flexner was asked by Henry Pritchett, president of The Carnegie Foundation for the Advancement of Teaching to conduct a similar survey of medical education in Europe. Flexner visited a number of medical schools in Europe and found similar problems but also specific strengths in the British clinical experience and the German university organization and scientific laboratories (Flexner & Pritchett 1912). Yet, nowhere did he find the close connection of preclinical sciences to the medical clinics that he believed was essential to a modern medical education. His recommendations, embedded in both reports, have guided medical education in North America and Europe for the past century.

However, much has changed over the past 100 years in the practice of medicine, the therapeutic interventions and technologies available to medicine, the competencies expected of physicians and the processes employed to educate them. In response to these changes, medical educators have creatively envisioned new and often novel educational innovations to

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address current challenges in medical education. Today, there is no shortage of innovations in medical education (Irby & Wilkerson 2003).

In 2004, The Carnegie Foundation for the Advancement of Teaching commissioned another study of medical education as part of a five profession examination of preparation for the professions. Our study, like the other four, followed Flexner's method of conducting site visits to examine the current state of professional education. We site visited 14 medical schools and academic health centers, seeking notable innovations in clinical education for medical students and/or residents. Based upon what we learned from these visits and a comprehensive review of medical education and learning sciences research, we formulated four recommendations for the future of medical education: (1) standardize on learning outcomes and individualize learning processes, (2) integrate formal knowledge with clinical experience, (3) incorporate habits of inquiry and improvement into medical education at all levels, and (4) focus on the progressive formation of professional identity. Each recommendation is described along with accompanying examples of innovations from medical schools that have led the way in trying to address current challenges in medical education through changes in curriculum, pedagogy, and assessment.

Standardization and individualization

Medical education should standardize on learning outcomes and general competencies rather than on the length and structure of the medical curriculum (which is what accreditation processes have historically focused on), and then provide greater options for individualizing the learning experience for students. This model acknowledges the diversity of prior knowledge, skills, and abilities that students bring with them to medical school and assumes that some learners will achieve competency sooner than others. Correspondingly, the model opens up opportunities for students to pursue topics of interest in extra depth or to proceed more rapidly to the next stage of training.

Numerous competency frameworks and outcome objectives are being developed by such groups as the Accreditation Council for Graduate Medical Education in the US, the Royal College of Physicians in Canada and the General Medical Council in the UK, to mention just a few. These groups define competencies as broad areas of performance expected of a physician such as medical knowledge, patient care, interpersonal and communication skills, practice-based learning and improvement, systems-based practice and professionalism (ACGME in US) or as physician roles such as medical expert, communicator, collaborator, manager, health advocate, professional, and scholar (CanMEDS in Canada) or scientist, practitioner, professional, and scholar (GMC in the UK). Each of these competencies is defined and mile stones of performance (Green et al. 2009) are developed for each level of training.

A complementary assessment approach is called entrustable professional activities (EPAs) or activities that the faculty or the public would entrust to trainees at each level (Ten Cate &

Sheele 2007). EPAs constitute the major work of a profession and encompass multiple competencies. Within the field of obstetrics and gynecology, EPAs might include care of uncomplicated pregnancies, a normal delivery, and later in training high risk complicated delivery. When a resident is able to carry out one of these critical activities, they have attained all the competencies that are needed to adequately perform that activity, and therefore are entrustable to perform at that level.

As these competencies and milestones or EPAs are clarified and operationalized, educators are designing and modifying learning experiences to align with the competencies and milestones, making learning more efficient. Additionally, more and varied learning opportunities are being created to individualize the learning experience. This individualization can be conceptualized as core and depth – a core of essential training designed to facilitate learners' achievement of fundamental competencies and a variety of options for delving into areas of interest in greater depth and achieving supplemental competencies. For example, this might mean within a 4-year MD curriculum the core competencies could be achieved in 3 years and a fourth year could be for depth (i.e., an area of scholarly concentration), remediation, career exploration, or accelerated advancement to residency. In a 6-year MD program, the fifth year could serve the same function. Alternatively, an individual learner might achieve competence in a domain quickly, say in culturally competent communication skills and choose to opt out of further requirements in that domain in order to take elective experiences in population health and quality improvement.

Within a standard 3-year internal medicine residency program, core might be 2 years and depth the third year. In the third year, residents could choose a hospitalists track, a primary care track or entry into a subspecialty fellowship such as cardiology or pulmonology. Using this concept, the boundaries between levels of training (MD, residency, and fellowship) could become more permeable as individual learners attain competence at varying rates.

By focusing on outcomes, the learning process can be individualized in new and exciting ways. This is facilitated by new technologies, such as simulations, on-line learning, and mobile learning resources, which enable individualization in powerful new ways.

Integration

Integration refers to the connection of formally structured knowledge of the basic, clinical, and social sciences with clinical experience in a much more balanced manner than is true today. Just as physicians utilize pattern recognition based upon seeing many cases along with analytical reasoning based upon formal knowledge and best evidence, so too students and residents need to be continually connecting these two forms of knowledge and their associated reasoning processes. This means that early medical students need clinical immersion along with basic science instruction while later medical students and residents need more intense exposure to the sciences and best evidence underlying their practice. Learning is strongest when a case is connected to a foundational

concept and is learned in the context of later use in patient care.

Many medical schools provide clinical experience in the first 2 years although increasingly more schools are devoting larger blocks of time to clinical exposure early. A few schools begin with clinical immersion at the beginning of medical school and then add in the basic sciences. Another medical school begins clerkships in the second year, which runs simultaneously with basic science instruction. Clerkships fill the mornings and related science instruction occurs in the afternoons. The science instruction integrates basic, clinical, and social sciences in organ system courses using a problem-based learning format.

In the clinical years, a limited number of schools have moved beyond the specialty-based block rotation model to create longitudinal integrated clerkships. Instead of rotating every 6 to 8 weeks through the standard block clerkships (medicine, surgery, pediatrics, obstetrics and gynecology, and psychiatry), students stay in one setting for 6 to 12 months and work closely with a group of faculty from each of the core specialties. Students work and learn with the same set of clinicians in their half-day clinics each week and develop a panel of patients whom they follow longitudinally. In addition, the cohort of students in that multi-specialty clinic or hospital setting have an integrated curriculum one half-day a week that correlates learning required to care for their patients with the medical literature (Norris et al. 2009). This model reduces discontinuity students experience in the classic clerkships and increases integration in curriculum and assessment across the year.

Finally, some schools are working to help students more effectively see the range of roles physicians play and how those are integrated into a career in medicine. These include roles such as patient advocate, resource manager, innovator of clinical practice, scholar, team leader and community leader, and change agent. Longitudinal integrated clerkships and community-based clerkships offer opportunities to see this broader range of physician roles in practice.

Habits of inquiry and improvement

To promote excellence throughout a lifetime of practice, students and residents need to be actively engaged in inquiry, discovery, and innovation. This involves developing the habits of mind and commitments of the heart to continually advance medicine and to increase the effectiveness of health care delivered to patients. Curiosity is the engine that drives learning in medicine and can advance patient care within a single practice or a complex medical system. Educational programs that stimulate curiosity and inquiry foster more than just learning factual information and routine forms of expertise needed to efficiently practice medicine but also encourage students to learn how and when to adapt their practice in complex situations, to expand their knowledgebase and to innovate in practice. This involves developing the judgment to know when to shift from routine nonanalytical expertise to more effortful analytic functioning when the need arises. Learning when to slow up when you should involves

metacognitive self-monitoring skills and the ability to adapt performance to the needs of the situation (Moulton et al. 2007).

Students learn habits of inquiry and improvement in the context of small group and problem-based learning, in clinical conferences where their thinking is challenged and augmented by other perspectives, in research where new insights are discovered, and in patient safety and quality improvement projects where creativity begets innovation. Physicians need to be equipped to engage collaboratively with other health professionals in bringing about system changes. To do so requires learners to master the scientific foundations of system performance and actively participate, along with faculty and other health professionals, in team-based improvement (Berwick & Finkelstein 2010). Some schools are beginning to emulate the didactic and experiential learning programs for residents who are assigned to project teams responsible for working on near miss reporting, error reduction, patient safety, and quality improvement programs in hospitals and clinics.

Learning the methods of inquiry and the scholarly tools of discovery develops the capacity to challenge accepted wisdom and existing practice. Many schools offer areas of concentration and joint degrees in areas such as public health, global health, molecular research, clinical and translational research, and medical education. Each of these disciplines has a rigorous method of advancing the field and improving practice; learners can incorporate these scholarly tools into their lifelong approach to learning and practice.

Inquiry and improvement are best learned in a community of practice where these habits are demonstrated in daily practice and reflect the shared values, aspirations, and dispositions of the members of that group. These are often the defining characteristics of a university, which is why Flexner argued strongly that physicians should be educated in universities. But, these characteristics can also be found in some health care organizations and hospitals which strongly value excellence and innovation.

Identity formation

Identity formation involves the process of becoming a professional through expanding one's knowledge, understanding, and skillful performance; through engagement with other members of the profession; and by deepening one's commitment to the values, dispositions, and aspirations of the profession into habits of the mind and heart (Cooke et al. 2006; Irby et al. 2010). Professional formation is a synthetic process that occurs in connection with mastery of the other competencies, is developmental in nature and involves taking on the identity of the physician through immersion in a community of practice. If the practice community exemplifies the highest values of the profession, students adopt those values and behaviors as part of their socialization into the clinical setting. Unfortunately, they often observe unprofessional interactions between doctors and nurses, and between doctors and patients. This culture of unprofessional and disrespectful actions, sometimes referred to as the hidden curriculum, can undermine efforts to inculcate the highest values of the profession (Hafferty 2006).

Instructional strategies used to promote professional formation include courses on ethics and professionalism, codes of professional conduct, and participation in rites and rituals such as white coat ceremonies. Formation is furthered through reflection on experience, self-assessment, and intentional planned change in professional behaviors. Longitudinal mentoring, feedback, and coaching offer students support and guidance as they progress toward becoming physicians.

Some schools have adopted appreciative inquiry as a specific strategy for lifting up the highest values and best behaviors of the profession for public scrutiny and celebration. Students, residents, and faculty members are asked to write about exemplary acts of professionalism and then are asked to share them publically. This celebration keeps the best behaviors at the forefront of the community's attention and emphasizes to all the importance of respectful and compassionate actions (Suchman et al. 2004).

Other schools recognize that the vast majority of physicians act in caring and compassionate ways. Thus, the key to creating a strong and positive learning environment is to develop a mechanism for identifying, remediating, or removing the few physicians who are destructive to the learning and patient care environment. Students rate residents and faculty members that they have worked with in terms of whether they "treated me with respect" or "treated others with respect." When low ratings are repetitively received, administrative interventions are made to improve or remove the low performing residents and faculty members from teaching (Papadakis et al. 2004).

Professional identity formation is achieved through immersion in an institutional culture that values competent and compassionate care combined with collaborative and respectful team interactions.

Summary

The current framework for medical education was forged over 100 years ago and structurally has changed very little. In order to create more effective learning opportunities for our students and residents, we need a new model that is based on a rigorous platform of competency-based instruction and assessment while offering individualized learning processes, integrates formal knowledge with clinical experience, inculcates habits of inquiry and improvement, and focuses explicitly on professional identity formation. Educational innovations in all of these areas are pointing the way toward medical education of the future.

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