

The Role and Importance of Research and Scholarship in Dental Education and Practice

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Abstract: Understanding the role and importance of research and scholarship in dental education and practice requires an appreciation of dentistry as a learned profession. A foundational attribute for the members of such a profession has to be sheer intellectual curiosity—a trait as important for the clinician as for the scientist. That improved patient care results from technical advances made possible through research is not seriously disputed by anyone. What is less apparent, however, is the role for research in the *education* of dentists and in the broader life of dental schools. Accosting this matter requires a distinction to be made between research and scholarship: while all research qualifies as scholarship, not all scholarship qualifies as research. Though the exact role of research in the educational process is open to debate, the importance of scholarship is not. An education colored by research is one way of achieving the intellectual rigor necessary for the professional. The key is cultivating in students a taste for complexity, for problems, and for problem solving. All dental schools without exception need to help students acquire this taste. In doing so, they will generate a few scientists; but, more importantly, they will create out of every graduate a man or woman of science. Only by becoming a person of science is there any hope that the practitioner will be able to acquire and assimilate new knowledge and to adapt to the changes in practice and in the profession that the future requires.

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“He was blessed with the sort of intense curiosity that most of us experience so infrequently it often seems to come as a surprise. I’m not talking about the kind of curiosity that INVITES but about the kind that DEMANDS, not about the kind that says I WONDER but the kind that says I MUST KNOW. The kind that makes you immerse yourself in a subject, ponder it over and over until you are able to make sense of it for others and, in so doing, give your own life new meaning in some small way. Under such a spell, humans can accomplish the extraordinary.”¹ This portrayal, by Miles Harvey, of the nineteenth-century geographer and polymath Alexander von Humboldt is the description of an extraordinary scientist. It is a description highly relevant to the role and importance of research and scholarship in dental education and practice because it provokes the question: Is the calling to be an outstanding clinician really any different from the calling to be an outstanding scientist? The passion to know is common to both. In the case of the clinician, that need serves the interest of the individual patient. For the biomedical scientist, that need serves the interest of all patients. The kind of curiosity that demands and that says I must know and that drives all scientific inquiry is, at its root, identical to the kind of curiosity that underlies clinical practice at its best. A commitment to such a level of excellence is the

premise on which care for patients is supposed to be based, assuming the vehicle for such care is the learned profession, as opposed to a trade or a craft. Fundamental to the learned profession is curiosity—curiosity in the service of scholarship leading, in turn, to scholarship in the service of humanity, and ultimately scholarship in the service of an individual human being.

At least that is the theory. But is it true, or is it just some hypothetical abstraction bearing little relevance to the world of practice and to the care of real patients? Is this idealized version of scientific curiosity the basis for how we train clinicians in dental schools? If not, should it be? Do we even see it as an ideal worth working toward?

Cultivating a Taste for Complexity

That improved patient care results from technical advances made possible through science and research is an assertion not seriously disputed by anyone. Insofar as universities are expected to contribute to the improvement of life through research, the obligation of dental schools, as parts of universities, to do so as well is obvious. What is less appar-

ent, however, is the appropriate role for research in the *education* of dentists and in the broader life of dental schools. This is an entirely different question and is one worth asking. The answer is not intrinsically obvious. Universities, along with parliaments and cathedrals, are an invention of the Middle Ages² but, unlike the other two, universities are devoted exclusively to scholarship. We usually say that modern universities have as their mission research, teaching, and service; but this is a kind of shorthand. The university's mission expressed in its longhand version might be: SCHOLARSHIP in the service of research, SCHOLARSHIP in the service of teaching, and SCHOLARSHIP in the service of the community. This expanded version of the mission of the university accentuates a subtle but important distinction: All research qualifies as scholarship; but not all scholarship qualifies as research.

The term "research" is actually a difficult one to define. When the organizers of this conference asked me to address research *and* scholarship, they clearly held the view that these two terms are not absolutely congruent. Faculty probably have a good sense of what is meant by the term "research" as it is used in their home universities. A very incomplete list of phrases that spring to mind when contemplating such a definition might be: experimentation aimed at the discovery and interpretation of facts; hypothesis testing; application of the scientific method; generation of a product based on such activities and leading to publication and dissemination of findings; and, of course, a whole panoply of related behaviors encouraged by so-called research-intensive universities. Scholarship encompasses all of this, but it also encompasses much more. For instance, teaching contributions could clearly qualify as serious scholarship, while not necessarily qualifying as research as conventionally understood. Activities that do not qualify for NIH research support or for publication in a scientific journal may nevertheless evince great scholarship. Any university that includes in its mission both teaching *and* research is making the same subtle distinction inasmuch both activities, at their best, qualify as scholarship while only one qualifies as research. By way of example, this paper might qualify as scholarship, but it would not qualify as research. The same is probably true for review articles in general. Correspondingly, though there may be research-intensive dental schools and research non-intensive dental schools, scholarship is possible in both.

While the exact role of research in the educational process is open to debate, what is not open to dispute is the importance of scholarship, both in dental education and in other kinds of higher learning. From the standpoint of helping the public through the discovery of new treatments, cures, and diagnostic methods, what is important is research. From the standpoint of training dentists as legitimate members of a learned profession, what is important is scholarship—basic intellectual rigor of a sort that includes and goes beyond the often cited but hard to define scientific method. That scholarship of the highest order encompasses more than just science is evidenced in fields as distant from science as history and literary criticism. Nevertheless, an education colored by research is one way—but only one—of achieving the objective of intellectual rigor and of helping cultivate in students an appreciation for complexity. This taste for complexity—an acquired taste—may be the single biggest distinction between the members of a learned profession on the one hand and the members of a trade or vocation on the other. Donoff³ has underscored this point by distinguishing between true education and simple training, asserting that "the body of knowledge that science provides shows students ways of understanding and making sense of the complexity of the experience of patient care." Much of professional education entails learning to cultivate more sophisticated tastes and more nuanced satisfactions. High-stakes problem solving is one of them. Acquiring the taste for complex issues, for problems, and for problem solving comes naturally to some people; for others, it needs to be cultivated. This, more than anything else, is what higher education is supposed to accomplish. All dental schools without exception need to help students acquire this taste—though there may be more than one way of doing so.

Why is this objective so important for dental education? Because in dentistry the risk of slipping into vocationalism is great, as is the seduction of a simplicity-based ethic: a mindset that says, just tell me what I need to know and nothing more; keep everything snappy, practical, and up-to-date, with nothing theoretical and irrelevant. Students, the educational consumer, can be astonishingly ambivalent, leading to the observation that education is the only business in which the clients want the least for their money.⁴ The tendency, by the way, to simplify and to pragmatize by offering useful information eviscerated of any real understanding or true knowledge is

nothing new. Examples, sometimes humorous, can be traced back virtually to the inception of universities in which competitors advertised desiccated curricula for their practicality.² The problem with such an approach is that it encourages acceptance of flawed assertions as true and tends, in the long run, to move one away from truth rather than toward it. The phrases “This works well in my hands” or “I do it this way and I never have a problem” are commonly heard in dentistry. When they are, they do not represent the voice of a man or woman of science.

Assuming no serious disagreement over the importance of scholarship in higher education, two different models present themselves for dental education—both of which are consistent with a high standard of scholarship: A research-educational model and a pure educational model. This is similar, by analogy, to the distinction in baccalaureate-level education between the university on one hand and the small liberal arts college on the other.

The Research-Educational Model

Research is an understandable tropism for university administrators because of the ancillary benefits attendant to successful science, including indirect cost recoveries and the public esteem attached to rankings of universities according to research funding levels. But why would a student seek professional education within a large, sometimes dystopic, research-oriented university rather than within the more congenial atmosphere of a purely instructionally oriented college where the focus can be exclusively on teaching and teaching well? It is, after all, education that students seek. This is a question college freshmen continually ask when they decide to pursue their degree within a university versus an independent liberal arts college.

According to Rosovsky,⁵ the answer lies in the admittedly “controversial belief that research and teaching are complementary activities; that university-level teaching is difficult without the new ideas and inspiration provided by research. A combination of teaching and research is part of the university faculty identity. The university professor is not a teacher who is expected to confine him- or herself to the transmission of received knowledge to generations of students. He or she is assumed to be a producer of

new knowledge . . . who transmits state-of-the-art knowledge to students at all levels. The interaction of undergraduate student with college teacher and undergraduate student with university scholar is intellectually different, not better or worse, but different; in fact, better for some and worse for others.”

Rosovsky further asserts: “Research is an expression of faith in the possibility of progress. The drive that leads scholars to study a topic . . . [is] the belief that new things can be discovered, that newer can be better, and that greater depth of understanding is achievable. Research, especially academic research, is a form of optimism about the human condition.” Moreover, he adds, persons with faith in progress are more likely to possess an intellectually optimistic disposition. He also states that “teacher-scholars are probably more interesting and better professors [and] less likely to present their subjects in excessively cynical or reactionary terms.” The model of professors taking an excessively cynical or reactionary approach to students is not completely unknown to dental education and may be contributory to why, on average, dental students do not like dental school⁶ or why they do not select dental educators as career role-models.

Rosovsky also makes the case that evaluating the quality of teachers and teaching is difficult and subjective: “The degree of professional consensus as to what is meant by outstanding teaching is not great.”⁵ In contrast, much greater consensus exists on what constitutes research capacity and achievement, there being some degree of agreement over “the relative merit of individual scholars” and the ability to back up opinions with convincing reasons through the process of peer evaluation. On average, peer review as practiced in the assessment of scholarship “produces clear answers that have a considerable degree of consistency and objectivity—at least when compared to evaluations of teaching.” The bottom line is “that faculty selection based primarily on research performance leads to fewer mistakes than choices based more on hard to define teaching ability. Both talents should be taken into account, but research ability is a better long-term indicator. Emphasis on more objective, even measurable, research standards should yield higher average quality in terms of recognized goals: lively, innovative, inquiring minds. With the power to sustain those qualities.”⁵ It does make a difference when the person who stands behind the lectern is the person who wrote the textbook.⁵

Finally, and perhaps most importantly, the research-educational model holds out the hope that graduates with those lively, innovative, inquiring minds will have acquired through their education the intellectual traction to judge for themselves the merits of the inevitable changes in practice that the future will bring. Doctors should not need to rely on others to do their thinking for them. Only by becoming a person of science is there any hope that the practitioner will be able to acquire and assimilate new knowledge and to adapt to the changes in practice and in the profession that the future always requires.

The Pure Educational Model

Just as different models of baccalaureate education exist (university versus liberal arts college), different models of dental education exist. Although we do not draw distinctions by calling different kinds of dental schools by different names as we do (inconsistently) for universities versus colleges, different schools do have different missions, and that means some will be relatively more research-intensive and some relatively less. No harm in that.

If the goal of all dental schools was to make a scientist out of every graduating dentist, then dental students would need to be nurtured in an environment steeped in research and populated by outstanding scientists. This is not, however, the goal of all dental schools. It is not even the goal of any single dental school, because the objective is not to make every dentist a scientist. Rather, the aim is to make every dentist a *man or woman of science*. This goal can probably be accomplished whether the school is identified as research-intensive or research non-intensive, provided the level of scholarship is high. Achieving this end may be somewhat easier when a whole campus culture speaks to and supports this notion. The key, however, is acquiring an in-depth appreciation for science, for scientific methodology, and for comprehending what does and does not constitute valid scientific evidence. Essentially, the pure educational (non-research) model offers as an option the possibility that dental education can be provided either through universities or through (semi)autonomous colleges with or without a university affiliation. In fact, the latter model has been followed by other kinds of health science schools such as osteopathic, podiatric, and chiropractic medicine. Dentistry has generally followed the university rather

than the autonomous college route, but this could certainly change. These observations should not be construed as being either good or bad, but simply as a change for dental education from the practices of the past, and as such warrant notice.

Rosovsky⁵ defines a school within a university as being part of a larger whole that includes graduate and professional schools. The general point being that graduate, professional, and undergraduate education coexist in universities but not in colleges. He points out that this would apply equally to Harvard, Brown, and the University of Alabama. But it would not apply to, say, Haverford College, where the principal educational mission of the faculty is to instruct students for their first higher degree. "These differences are anything but trivial. Universities tend to be large, busy places, most frequently located in urban areas. University students range widely in age, from eighteen-year-old freshmen to mature individuals returning for professional training after many years in 'the real world.' The faculty range is equally wide: clinicians, lawyers, architects mingle with scientists, economists, and philosophers."⁵ Colleges tend to be simpler, friendlier, more humane places where professors do essentially one thing: teach. The student is the center of attention and the beneficiary of more personalized service—with greater attentiveness accorded not only the student's education, but also his or her emotional, social, and psychological well-being. Colleges offer one last opportunity for institutional hand holding before students embark upon their work life. At (semi)autonomous colleges, the call upon resources is undivided between supporting the educational mission and the research mission—there is no apparent conflict of the sort encountered in research-oriented schools.

The Pendulum: Research University Versus Dental College

Clearly, both kinds of dental schools serve important social and professional missions, and some sort of balance needs to be maintained between schools serving one such model versus the other. For the past century, the aim was to emphasize the research-educational model; but what the appropriate balance should be between the number of schools following one model versus the other is a matter for

dental educators to decide. Recalling our past history will be an important element to consider in titrating the balance between university dental schools and quasi-independent dental colleges. It is easy to forget how far dental education has come during the last century. The notion of obtaining some legitimate baccalaureate-level education at accredited four-year institutions of higher learning prior to dental school was an innovation, as was the integration of dental schools into mainline universities. Picking up a current edition of the American Dental Directory⁷ readily reveals the impact of the change. Within the first few pages are a long list of now-defunct dental schools—and not just the ones that closed within recent memory, but innumerable independent, non-university-affiliated proprietary dental colleges that still have a few graduates listed in the directory. Their names are discordant to the modern dental educator's ear; names like Barnes Dental College, Central College of Dentistry, German-American Dental College, Homeopathic Hospital College, Interstate Dental College, San Francisco Dental College, Southeastern Dental University, National Medical University of Illinois, and many more. None of these organizations were part of any of the mainline colleges or universities that existed at the time; they were pure dental colleges. This is not to say that individuals could not secure a technical dental education at such places, but they embodied a different view from our own of what it means to be a dentist. At the beginning of the last century, dentists decided, audaciously, to align themselves with the finest institutions of higher learning in the world, seeking to transform a respectable craft into a legitimate profession. They were highly successful in doing so.

Consider these observations of Henry Rosovsky: There are slightly over three thousand institutions of higher education in the United States. At the top, in his view, are the best research universities, numbering about fifty, both public and private. He considers these institutions to be the cutting edge of our national life of the mind. They determine the intellectual agenda for higher education. They set the trends and establish the priorities.⁵

How have (or have not) the nation's dental schools become distributed among these elite research universities? In other words, among the nation's finest universities, how many have opted to have dental schools? A high level of success in incorporating dental schools into research universities of the highest stature could be one index of dentistry's

success over the past century or so in not only reinventing itself as a profession, but as a *learned* profession.

Answering this question requires knowing which universities qualify as the nation's best. Although Rosovsky was a great economist and scholar, he was also a dean and therefore adept at the important art of ambiguity. He never actually enumerated his list of the top fifty or hundred U.S. universities. But he did give tantalizing clues concerning the kinds of places he had in mind, asserting that such a list would include universities that "lead the world in basic science research; provide a significant share of the most competitive graduate programs; and . . . generally [are] at the cutting edge." Such universities are competitive with institutions of the same class "competing for faculty, research funds, students, public attention—and much else." He says that, at top American universities, "faculties are assembled on the basis of individual quality without the constraint of considering where they received their education." Quality and competitiveness dictate. At such places, there are no reservations about the beneficial effects of competition, seeing it as a strategy to prevent complacency or indolence, and prompting the drive for excellence and change. Such universities assume that the quality of their faculty plays the single most important role in maintaining reputation and position. The "best faculty attracts the finest students, produces the highest quality-research, and gains the most outside support."⁵

In light of this description, reconstructing Rosovsky's list might not be too difficult. Specifically, the National Institutes of Health (NIH) annual ranking of the 2,500 or so organizations receiving NIH support might constitute such a list.⁸ Accepting Rosovsky's figure of 3,000 institutions of higher learning in the United States, the top 150—just 5 percent of the total number—could justifiably qualify as elite. Among this group of institutions, forty-five have opted to have dental schools. In other words, the vast majority of U.S. dental schools are co-located with research-intensive universities—a significant accomplishment for a profession in just over a century. Of course, being co-located with an elite, research-oriented parent institution says nothing about the dental school itself. Therefore, an important question is how many of the dental schools that are part of research-intensive universities are not themselves—as dental schools—research-intensive? If they are significantly less research-intensive than

their parent universities, are they fulfilling their stated mission?

Inadequacy of Research and Scholarship within Dental Schools

Apart from Medicine and Law, few professional or graduate programs can compare with dentistry for the sheer number of highly talented people who seek dental education each year. Talent, of course, is crucial. It is the elemental currency of all professions and of all universities. Remarking on the world of talented people, Epstein observed that “Everyone picks things up so quickly, and no pity goes to those . . . unable to keep the ball in play.”¹⁰ Such is the environment in which dental education has to compete in order to survive.

How well have we husbanded the talent that comes to us each year in the form of new dental students? Perhaps not as well as we could. If that is true, the first thing to recognize is that we are not alone. For the first time in fourteen years, the total number of Ph.D.’s granted by universities in the United States has fallen,¹¹ the largest percentage drops occurring in engineering and the physical sciences. What confronts dentistry confronts all of higher education: Frank Rhodes, president emeritus of Cornell, claims “society’s agreement on what defines an educated person, what constitutes essential knowledge and common discourse, has essentially collapsed.”¹² Nelson and Lovitts¹¹ observe that academic graduate programs have been notoriously wasteful of their students for decades, sometimes treating students as expendable commodities rather than as precious resources to be cultivated. The result is that many graduate students never complete their degree programs and never enter academic careers. Perhaps the same can be said of dental schools and dental students. Fewer dental students probably drop out than do graduate students, but even when they do receive their D.D.S./D.M.D. degrees, they nevertheless exit the system permanently. In so doing, they sometimes abandon their early career plans that might have included not only their first professional degree, but also graduate education, advanced degrees, openness to a career in academics, and, possibly, a greater commitment to the importance of scholarship and intellectual excitement in their professional lives.

Nelson and Lovitts¹¹ offer a ten-point plan to encourage graduate students to enter careers in education. All do not apply to dental education, but many do. An important part of the plan is to create a hospitable academic environment that reflects an expectation and enjoyment of scholarly activity. Students might then find themselves admiring their faculty and wanting to be more like them—again emphasizing the importance of projecting a positive, familiar, and comfortable image of scholarship to students. At the very least, mentors for students must be people for whom scholarship and a life of the mind are important, not simply abstractions to be disparaged on the clinic floor or in the classroom as irrelevant or esoteric.

What Will It Take?

Rhodes¹² has posed the difficult questions facing all of higher education: How should universities best prepare graduates for a future in which specialized knowledge has a half-life of only a few years; “in which societal and ethical questions are deeply entwined with technical ones; and in which relentless learning over a lifetime is a prerequisite for professional and personal success?” He asks: What courses should universities require? What qualities should they nurture? He offers seven attributes that are the qualities fundamental to scholarship and whose transmission to new generations of students can determine the survival and success of a learned profession: 1) Openness to others and the ability to communicate with clarity and precision; 2) Self-confidence and curiosity, with the skills required to satisfy both; 3) A sense of proportion and context in the worlds of nature and society; 4) Delight in the richness and variety of human experience and expression; 5) Intellectual mastery and passion in one chosen area; 6) A commitment to responsible citizenship, including respect for and an ability to get along with others; and 7) A sense of direction, with the self-discipline, personal values, and moral conviction to pursue it.¹²

Whether these attributes are cultivated in dental students through a research-oriented model or a pure educationally oriented model is much less important than that they BE cultivated. To not do so would diminish a wonderful legacy inherited by the dental profession.

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