



## 'Undergraduate Education: What Good is it? An International Perspective

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A month ago I attended a university ceremony in Cambridge, Massachusetts—the Phi Beta Kappa Literary Exercises that precede Harvard University's graduation, or Commencement. The weather was sunny and the temperatures in the 70s. As Chief Marshal of Phi Beta Kappa I had the pleasure of marching at the head of the procession of our highest-achieving undergraduates, along with a fifer and drummer in 18<sup>th</sup>-century costume, on our way to speeches and applause in Sanders Theater. Two days later, thousands of Harvard students received degrees from fourteen different faculties, and celebrated with more cheers, hugs, and the display of symbols of their coming careers. (The graduates of the business school waved dollar bills.) Some 1600 graduating undergraduates were welcomed into the "company of educated men and women" by outgoing President Laurence Summers, and were warmly applauded both by the faculty and by their parents, doubtless both proud and relieved to see their offspring finally receive a diploma that represents four years of hard work and nearly \$200,000 in tuition fees and living expenses.

We know what a Harvard diploma costs. It is harder to say what good it is. What is it that justifies those efforts and that monumental expense—incurred by the university, through its generous program of scholarships, as well as by parents and often by undergraduates themselves, some of whom are expected to help pay their way at Harvard? What educational attainments merit being welcomed into the "company of educated men and women"? And through what process do students learn what they learn? How does that alchemy occur?

The "what" and the "how" of undergraduate education—these are the two big questions I propose to raise this evening, not in terms of Harvard alone, but in terms of universities generally, and with a particular eye on Melbourne and the "Melbourne experience." As I will argue, the "what" and the "how" are intimately related. Each student personally constructs his or her own understanding of what is being taught. The most important thing they can learn is the process of inquiry itself, modeled by the faculty in the course of their teaching. Thus how a subject is taught is crucial. Yet it is a curious fact that most discussions about undergraduate curricula focus almost exclusively on content. What seems to become easily lost in the debate is any real discussion about pedagogy. The assumption seems to be that if we can just get the content right, the teaching and learning will take care of themselves. That is an assumption with which I could not possibly disagree

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more strongly. I therefore hope to persuade you this afternoon that the “what” is somewhat less important, and the “how” far more important, than common wisdom would allow.

But let us nonetheless start with content. Here we may distinguish between two traditional views of the proper undergraduate curriculum, one stressing the development of marketable skills, the other the development of broader capacities of critical thinking or character development. We might call the champions of the former the specialists, and those defending the latter the generalists. Specialist education is advocated on the grounds of practicality, as determined by the marketplace, in that it fits graduates for immediate employment. From the point of view of society or the marketplace, the resources invested in such a degree are justified by its utility to the nation’s economy. Those in the opposite camp feel that non-specialist education is good for something that extends beyond, or above, a purely professional degree on various grounds—ethical, esthetic, and political—that are harder to define. John Henry Newman is perhaps the best-known spokesman for the generalists, and in fact I note that his name has been mentioned at some point in most of the previous Menzies Orations that I have had the pleasure to read in preparation for my own. So let me observe this local custom by quoting Newman at the outset: “There is a Knowledge,” he wrote in 1852, “which is desirable, though nothing come of it, as being of itself a treasure, and a sufficient remuneration of years of labor.” This is an example of the extreme generalist position, in which knowledge (a word that Newman capitalizes) constitutes its own end. A more moderate form of generalism, to which I myself subscribe, would argue for its practical uses as well.

All curricula can be said to have a shape. Specialized higher education, to my mind, resembles an Egyptian obelisk, attaining an impressive height at the expense of a narrow base. By thus trading height for breadth, the specialized course of study promotes rapid advancement in a particular realm, but its narrow base means that it can easily topple when exposed to the shifts and subsidence of technological change. A generalist education, on the other hand, resembles an Egyptian pyramid, with a broad base tapering toward a narrower summit. Only when that broad base is in place are progressively narrower masonry courses added on; if the particular summit requires alteration at some point in the future, the base is still there to support another one.

It is worth noting that the idea of a special preparatory phase of university education, intended to precede more narrow professional training, was integral to the original shape of European university studies as they took form in the course of the 12<sup>th</sup> and 13<sup>th</sup> centuries. The University of Bologna specialized in law; the University of Paris in theology. But only after completing a Bachelor’s degree in the faculty of arts was a student at either university permitted to enter one of these higher faculties. Students studying for the initial degree in Arts were expected to review their Latin—then the language of instruction—acquire the tools of scholarly disputation, and learn the rudiments of medieval science and mathematics. Two hundred years later, the Renaissance university expanded the previous Latin language requirement to include Greek and Hebrew without fundamentally altering the purpose of undergraduate study. A liberal arts education was still thought a proper preparation for all careers, including business and politics, just as the Faculty of Arts had served as a necessary portal toward more specialized studies in the medieval university.

This Renaissance variant, in turn, was the educational model adopted by the founders of Harvard College in 1636, most of whom were graduates of Cambridge University in the UK. The Harvard Charter of 1650 states that the College should foster “the advancement of all good literature

artes and Sciences,” making “all other necessary provisions that may conduce to the education of the English and Indian Youth of this Country in knowledge and godliness.” As late as 1820, Harvard students followed a set four-year curriculum that continued to emphasize godliness, but left no room for choice. Freshmen studied the Greek poets (in Greek), and Livy and Horace (expurgated and in Latin), as well as geometry and English grammar; upperclassmen were introduced to Cicero’s *De oratore*, the essays of John Locke, the Greek New Testament, Paley’s *Evidences of Christianity*, analytic geometry, chemistry, and the founding document of American politics, the *Federalist Papers*, in two volumes.

By the second decade of the 19<sup>th</sup> century the new German university had come into being, prompted by Prussia’s military defeat by Napoleon—which suggested an urgent need for educational reform—and by the Romantic Movement, which viewed knowledge as something freshly and continuously created rather than simply inherited from the past. As we know, the combined talents of Wilhelm von Humboldt, Johann Gottlieb Fichte, and a small circle of fellow German intellectuals and patriots contributed to the founding of the University of Berlin in 1810. It in turn became a model for other German universities, including some founded well before, where actual research became an increasingly important element in instruction. Links with industry also expanded, such as those between the pioneer chemistry professor Justus Liebig at the University of Gießen and the chemical concerns in the German Rhineland. Thus for the first time since its creation six centuries before, a true alternative to the traditional European university curriculum was now in place. Against the concept of a university with preparatory and advanced cycles, the German model focused on a narrow course of study leading rapidly to professional competence, enriched by research undertaken in concert between faculty and students.

As American colleges expanded their scope and ambitions in the last third of the 19<sup>th</sup> century (following the American Civil War), they maintained the concept of the four-year college, while adding graduate departments in Arts & Sciences and a growing number of professional schools. This compromise between the medieval model and the German model reaffirmed the preparatory role of the Bachelor’s degree. The competing terms of an uneasy balance were free choice on the one hand, and curricular coherence on the other. Harvard’s President for that same last third of the 19<sup>th</sup> century plus the first two decades of the 20<sup>th</sup>, Charles Eliot, stated in his inaugural speech of 1869, “For the individual, concentration, and the highest development of his own peculiar faculty, is the only prudence. But for the state, it is variety, not uniformity, of intellectual product, which is needful.” That variety would come from the “elective system” soon put in place by Eliot, which freed undergraduates from the set curriculum that had characterized Harvard studies for the previous 200 years. “The worthy fruit of academic culture,” Eliot asserted, “is an open mind, trained to careful thinking, instructed in the methods of philosophic investigation, acquainted in a general way with the accumulated thought of past generations, and penetrated with humility.”

Eliot’s idea was that students themselves were the best judges. They would know which of a growing number of courses would best suit their personal interests and best meet their future professional needs. His faculty and his successors in the president’s office, however, had more doubts than he about the effects of such curricular largesse. In 1906, a reaction to Eliot’s elective system brought Harvard’s first undergraduate “concentration” into being. History and Literature, an interdisciplinary field that is still in existence and in which I continue to teach, was an attempt to

bring some focus to course choices that seemed increasingly to be tending toward leading undergraduates in the direction of being jacks of all trades and masters of none. By the 1930s, the concept that undergraduates should know a lot about something, and a little about many things was beginning to take hold. It was codified immediately after World War II, when in 1945 a committee of Harvard faculty issued a book entitled "General Education in a Free Society," outlining a program of general education that was to occupy students for a quarter of their time at Harvard, and to cover the three major areas of the Humanities, Social Sciences, and Natural Sciences. A half of their time would be devoted to one of forty so-called fields of concentration, ranging from English literature to physics. And the remaining quarter would be devoted to the free electives so prized by President Eliot.

With the exception of a few elite institutions such as MIT and the California Institute of Technology, most American universities have adopted some version of this sort of generalism in shaping their requirements for the undergraduate degree. Why this consensus on a generalist approach? One reason is the poor state of secondary education in the United States. With no national system of education and 27,140 separate high schools, each marching to a different drummer, the quality of secondary education is highly variable and often in need of remediation once students reach university. A recent study concluded that more than 40 percent of students who arrive on American college campuses need remedial work; this is not surprising, since only half of our high school graduates who enter university have taken courses specifically designed to prepare them for post-secondary study. They arrive hungry to learn, but poorly prepared. The other reason is social. Since many of the best colleges and universities are residential, on the Oxbridge model, they are the sites of a deliberate social education that involves bringing members of an intellectual elite from a variety of different racial, ethnic, class, and geographical backgrounds into close proximity. If you're smart and black and live in South Central Los Angeles, you should be given a chance to go to a first-rate college, especially if that college is rich enough to afford you a full scholarship. As the Harvard admissions office likes to say, "Harvard admits the best graduates from the best high schools, and also the best graduates from the worst high schools."

These reasons for a generalist curriculum are perhaps peculiarly American. But there are other grounds put forward by my own institution and others that have more universal validity. As we know, the state of knowledge today is constantly changing, especially in the areas of science and technology. The content of fields as different as cell biology, astronomy, neuroscience, and ecology is not what it was even five years ago; this means that whatever students learn now will begin to be outdated almost as soon as they leave the university. Disciplinary boundaries themselves reflect human convention rather than natural necessity. They, too, are currently shifting to accommodate new academic alliances in efforts to understand complex systems such as the brain or global warming.

Thus early specialization results in learning that will soon have to be unlearned; it also robs students of an opportunity to stretch their imaginations in order to empathize and interact with other humans whose academic training differs from their own. Learning how practitioners of other fields think is one key to making possible the teamwork required by interdisciplinary investigation. Just American students are encouraged (some would say forced) to broaden their social horizons by living with students from very different social backgrounds, having some familiarity with the cultural differences between, say, a sociologist and an architect can be an important advantage for a future

city planner, just as knowing something about materials science can aid the future reconstructive surgeon. Moreover, we should not assume that students will remain within a single profession during their adult lives. With experts now predicting that American university graduates will have up to eight different careers, having a flexible intellectual repertoire would seem a sensible precaution.

But the same burgeoning of fields and increasing specialization that makes specialized curricula problematic on an undergraduate level also creates a dilemma for the generalist. Which courses should they choose among the hundreds on offer? Are some better suited to preparing students for future specialized study than others? If you ask faculty, few will admit that their particular discipline has nothing to offer undergraduates in search of a general education. When Harvard's faculty debated the fields that all undergraduates should have some knowledge of in 1945, they recommended three: humanities, social sciences, and natural sciences. When the curriculum was reviewed again in 1978, that number had more than tripled. The new Core curriculum included eleven subjects: foreign cultures, historical studies, three types of literature and arts, moral reasoning, quantitative reasoning, two types of science, and social analysis. Even that apostle of free electives, Charles Eliot, suggested a canonical "five-foot shelf" of fifty volumes in the latter years of his Harvard presidency that all should read. Though daring for the year 1917, some seem decidedly quaint today. John Bunyan's *Pilgrim's Progress*, William Harrison's *A Description of Elizabethan England*, and Philip Massinger's *A New Way to Pay Old Debts* occupy places of honor that might better be taken by Marcel Proust, James Joyce, or Patrick White. But idea that all that an educated person need read is to be found in five or even fifty feet of bookshelf space ignores the claims of art, film, dance and music. It ignores the importance of laboratory science, or anthropological fieldwork. In the arts as well as the sciences, it falls short of what we could properly insist that an educated person know today.

Attempts to define general education through content alone—be it a canon of books or a set of subjects—are doomed to failure. The sheer mathematics of time available and number of fields to be covered in order to acquaint oneself with the "accumulated thought of past generations" dictates an attitude of modesty when it comes to prescribing a general education. There is an inevitable trade-off between breadth and depth, in which more and more topics are covered less and less well. The old joke about what in the United States are called Western Civilization courses—in effect survey courses of European history from the Middle Ages to the present—is that if you unlucky enough to sneeze in the midst of lecture you miss the French Revolution. Simply covering a broad array of topics is not useful. Selecting a narrow array with the justification that these are the most important will ensure a *querelle de précedence* among academics, each convinced that his or her favorite subject is about to be offered up on the altar of curricular expediency.

What good is undergraduate education? In the short term, an undergraduate education that trains students in a particular line of work, be it forestry or nursing or materials technology such as plastics can be defended as long as the training involves sufficient hands-on practice. But such training has an increasingly brief shelf life, and, at least in the United States, is perhaps better left to the training offered by a business or industry once the college graduate has been hired. Long-term, a generalist undergraduate education provides a more flexible and, ultimately, more practical type of learning. That is presumably why the Sorbonne Declaration of 1998 and the Bologna Declaration of 1999 endorsed the adoption of a two-cycle system—undergraduate and graduate—throughout the

European Union, in effect endorsing the British and American approach to undergraduate education over that of the Germans, and returning to the original conception of a university with elementary and advanced levels of learning.

So much for the content, the “what” of undergraduate education. Let me now turn to the “how.” Within the framework of what I have called a moderate generalist education, it does not matter nearly as much what subject matter our undergraduates study as it does how they study it. Of course it is important for them to be introduced to fields they have previously ignored through some sort of distribution requirement. And it is important for them to spend enough time on each intellectual area they study to gain more than just a cocktail party or “bluffer’s guide” acquaintance with its main ideas. But in the end, I believe that the best way to do this is through supervised research projects, where students go out on their own and ask questions of the world around them, the exhibits in university museums, the texts in libraries or on line and then test their answers against the opinion and scrutiny of faculty and fellow students. What it means to enter the company of educated men and women is finally to understand the rules of evidence and discourse that govern that community and to be able to participate, on however junior a level, in a discussion that has been ongoing at least since the founding of the University of Bologna in 1158 and, some would argue, since the time of Parmenides and Plato. The company of educated men and women, in my mind, is one that fosters intellectual exchange and commitment to the process of inquiry itself.

One of the most significant extensions of our knowledge over the past thirty years, at least in its potential to alter what is practiced in university classrooms, is our understanding of how students learn. Thanks to the combined efforts of educational researchers such as David Hestenes and Ference Mårton, as well as to neuroscientists and cognitive psychologists too numerous to mention, we are in a far better position to identify what serves learning than were faculty in the 1970s, when the current Harvard core curriculum was devised. For example, we know that active student involvement in learning results in more and longer-term retention than passive attendance at lectures; that training students to monitor their own learning through frequent feedback is superior to infrequent testing; that emotional engagement increases depth of learning; that group work is often superior to solitary efforts. We also know that student misconceptions about the world are extraordinarily robust and resistant to change, in other words that teaching students at the university level, when they have already had time to form these opinions, poses an even greater challenge than we thought. If you like, the progress in understanding the process of teaching and learning over the past three decades has increased the power of the pedagogical tools at our disposal while simultaneously revealing a far greater challenge to be met with their help than we had previously acknowledged.

Creating knowledge is often cited as a key university priority. Where is this knowledge created? The standard answer is that it is created in laboratories and research institutes; its success is crowned with peer review publications and, for a fortunate few, with the Nobel Prize. That is all true. Yet it is only half or even less than half the story. Knowledge is also created every time a student grasps an existing idea or a concept, however many others may have already reached that same point of understanding. For such knowledge is created within that one particular student for the first time, since that he or she has had to assemble understanding on his or her own out of the materials made available by teachers, fellow students, or personal experience. When we think of learning, we may think of students’ heads as empty rooms, ready to be furnished by the faculty who, like movers,

arrive with a van full of beds and desks and chairs and bookshelves. But it would be far more accurate to say that it is the students who must build their own furniture—perhaps with ready-made parts, à la Ikea, but still ultimately by themselves, since pre-assembled furniture will not fit through the door of the mind. Moreover, to push this analogy a bit farther, the rooms to be furnished at university are not empty. Would that they were! Instead, they are already full and overfull, often crammed with very shoddy furniture indeed, which has to be carted off to the tip before refurbishing can begin.

Let me illustrate what we might call the “problem of prior knowledge” with an example drawn from my own university. In 1982, a film crew hired by the staff of the Harvard-Smithsonian Center for Astrophysics and funded by the American National Science Foundation, attended the very graduation ceremony which whose description I began my remarks this evening. At the ceremony’s conclusion they interviewed seniors, still in their academic robes, proudly holding diplomas that attested to their formal induction into the company of educated men and women, literally basking in the sun that, more often than not, shines on Harvard Commencement. The filmmakers asked these happy graduates a deceptively simple question: What causes the seasons? The answers, recorded on film, are delivered with ease and self-assurance, in complete and grammatical sentences, with the sort of polish one would hope that a Harvard graduate could command. These students had all met Harvard’s science requirement. Some had taken several more science courses than the number required. Yet 21 of 24, including a Harvard history professor who happened to be a parent of one graduating senior, failed to answer correctly and give the true reason for why it is warmer in Cambridge in July than in December.

Watching this film is an electrifying moment for anyone who believes, as I do, in the importance of general education. It challenges our assumptions about how education works in a fundamental way. Viewers cannot help but be impressed with the presentation skills of these students, while at the same time lamenting how little effect their education has had on their beliefs. Most students explain that the orbit of the Earth around the sun is an ellipse, and thus in winter the Earth is farther away from the sun than in the summer. The farther away, the less heat reaches it, and hence winters in New England are colder than summers. These Harvard students are obviously reasoning about the solar system by means of an analogy derived from their own repeated personal experience, namely that approaching a heat source makes you warmer. That is true of a stove, heat vent, or fireplace; and it would be true of the planet we live on if, indeed, the Earth’s orbit was elliptical. But it is not. Moreover, none of these students pauses to reflect, or uses other data to check what they know about stoves and heat vents and fireplaces. Not a single one questions their assumption that climate on Earth is uniform. Not one wonders why Americans import grapes from Chile in March, or why some Australians spend Christmas at the beach.

So what lessons are to be drawn from this display of eloquent misunderstanding? The first and most obvious is that Harvard students are good at pretending to knowledge they do not possess. The second and more important is that students are not necessarily learning what they or we think they are. Just because they pass courses and get a degree does not

necessarily guarantee anything except that they are good at taking examinations. I believe that most faculty at Harvard and elsewhere are genuinely unaware of how little their students are learning. But I also suspect that at least some of them do not want to find out. They do not want to test their students' learning in ways other than the traditional papers and written examinations for fear of what they might discover—namely that high grades do not necessarily signal deep understanding. An honorable exception to this ostrich state of affairs is the physics community, which has done a great deal to reform both its teaching and its examination procedures. As for the rest, change is yet to come.

It used to be said in the former Soviet Union and other countries of Eastern Europe, where the state was the sole employer, that “they pretend to pay us and we pretend to work.” That is, the monetary rewards under Communist rule were such that no one labored very hard, and no one complained that their salaries were nearly worthless. Today, at least in the United States, we could emend this cynical observation to read: “they pretend to teach us, and we pretend to learn.” In a university community where no one—neither faculty nor administrators nor students—has enough time, whether for research or management or study or social life, an arrangement that makes minimal academic demands satisfies all parties. I believe this to be the fundamental problem facing the undergraduate curriculum, and that recognizing how little our students are learning is the prerequisite for making changes that create an education that is actually good for something. Choosing an appropriate content is a necessary but not a sufficient condition for getting anyone to learn anything. The sufficient condition is for it to be taught well. And by “taught well” I do not mean taught so that students receive high marks. Rather, I mean taught so that they are capable of understanding and applying what they claim to know.

Yet if we face a too frequently unacknowledged problem, the tools to remedy this situation are also at hand. These are the tools of research. If there is one thing that the great universities of the world can do, it is engage in inquiry on a broad scale. A recent book by Harvard's once and future president, Derek Bok, for whom my center is named, suggests that the research capabilities of the university be devoted in part to ascertaining just what sort of learning occurs within its precincts. There are sophisticated and even not-so-sophisticated procedures that would allow research universities to engage in what we might term a process of pedagogical self-examination. At Harvard virtually no faculty pretest their students at the beginning of the semester; and yet without this, how can they possibly tell what the students have **learned** during their course? Very few experiment with different types of teaching to see which is the most effective. Even fewer try to reshape their courses to respond **to** deficits in student learning. This seems a self-evident strategy, yet I vividly recall a historian colleague complaining after reading his final examinations that “the kids can't write any more.” When I inquired what he did specifically to improve their writing skills, he responded with a moment of shocked silence before replying: “Nothing, nothing. I just figured they'd pick it up as they went along.”



But there is a second and even more important reason to devote attention to teaching as part of a generalist undergraduate curriculum. What we are teaching is at bottom not so much content as a process of inquiry, not French history or invertebrate biology or the poetry of William Butler Yeats, but ways of asking questions and exploring hypotheses and coming to conclusions. These things cannot be taught in the absence of content, yet they are the skills that students will bring to an advanced degree or to careers in business and industry, much as medieval students brought skills in grammar and rhetoric and logic to the study of law, medicine, and theology. In other words, the “what” of an undergraduate education that is good for something is identical with the “how.” And the “how” is modeled by faculty in their daily instruction. Seeing faculty engage in inquiry is a prelude to students becoming engaged in it themselves.

Even Germany, the original home of the research university, has begun to pay more attention to teaching well, in an effort to improve Germany’s international competitiveness. Four years ago the state of Baden-Württemberg, home of some of Germany’s most successful car manufacturers, began an ambitious program to create three regional teaching centers to serve faculty in the nine state universities, and to help students move from a focus on individual mastery toward a focus on group learning. As a foreign member of the advisory board created to oversee this process, I have had a first-hand opportunity to see that this sort of transformation poses the same pedagogical problems as other kinds of teaching. German faculty, like Harvard undergraduates, have certain very clear ideas about how the world works. Replacing those ideas with others more congruent with reality is a long, slow process. In fact one of my principal roles as a board member has turned out to be periodically reminding my German colleagues of the need for patience, of the necessarily slow pace of culture change, and of the fact that the traditions of two hundred years cannot be altered in four.

For many students, particularly those studying a specialist curriculum, what the university offers is a series of answers to questions they have never learned to ask, generated by a research process they have never been encouraged to understand. So if we want students to understand what we are doing, we need to introduce them to the process as well as the results of research. We need to take them into our laboratories and libraries, either directly or virtually. Now the argument against showing students what is behind the scenes is that this is inefficient. Surely it makes more sense to present the conclusions of research in a succinct and orderly manner than to confuse them with blind alleys and current debates? My counterargument is that undergraduate education is condemned by its very nature to be inefficient; efficiency is a mirage, or worse, an excuse. The first thing that an undergraduate education should teach students is what the faculty are all about—what it means to discover things. Critics of evolution in the United States assert that evolution is “just a theory.” This betrays their lack of understanding, not just of evolution, but of the scientific method as a whole. Of course evolution is just a theory; so is quantum mechanics, plate tectonics, and gravity. In the humanities, “theories” become “interpretations,” but the process of selecting the reading of Eliot’s *The Waste Land* that best conforms to your understanding of the evidence is every bit as much a process of discovery, and every bit as provisional, as a scientific hypothesis. Putting together theories about the world and testing them; interpreting a poem or religious scripture on the basis of evidence; examining economic data and offering predictions—all these are examples of what faculty should be aiding students to undertake themselves.

The skill that would be of most practical value to our undergraduate students, in my opinion, as well as the key to what we mean when we speak of educated men and women, is the ability to ask good questions and to work at seeking answers based on evidence. University faculty are extremely good at offering students their own answers, often to questions that the students themselves fail to ask or even to understand. Students who are given the task of generating questions on their own, at least at Harvard, go through a long apprenticeship and may experience frustrating failures before grasping that being puzzled is a gift rather than a sign of ignorance. Those students who answered so confidently about the cause of the seasons were in many ways the products of a university system that privileges answers over questions, certainty over puzzlement, even when that certainty is fake and in error. Students need an atmosphere in which they can stumble occasionally and not pay a penalty, in which they can return to a question again and again, searching for answers that get more solid with each iteration, and can even ultimately relish the messiness and inefficiency that are the handmaidens of creativity. If the graduating Harvard seniors had not felt obliged to offer an instant answer for the benefit of the movie cameras, perhaps they might have paused to consider whether the state of Victoria has seasons identical to those in Massachusetts, or even admit what few Harvard students ever bring themselves to say: “I don’t know.”

My preferred moderate generalist curriculum would resemble neither an obelisk nor a pyramid, but rather a spiral, with students returning to the same issues at progressively more sophisticated levels several times during their years at university. These issues would be the most basic ones of research itself: how to ask questions, how to frame plausible answers, how to test them with evidence. They would also include the ethics of inquiry, including respecting data, the work of others, and the obligation to convey what one knows. Together they form what most of us think of as the special values of our special institutions. There is no reason why one cannot have a coherent generalist program built around skills or methodology, as long as we recognize that skills such as those of research or inquiry are not developed in a vacuum, but always within the context of a particular discipline.

Thus a final goal of undergraduate education, I would argue, should be to acculturate students into the aims and values of an institution that depends crucially on public understanding and support—the university itself. The pursuit of intellectual inquiry, using tools and conventions developed in the course of 2,500 years of Western culture, enriched by the traditions of Asia and India, is not something that we should expect entering freshmen to grasp without some aid. By and large faculty assume that if you are at university, you already know what is meant by scholarly inquiry, the proper use of evidence, and so on. A faculty member from the Harvard Business School came to me several years back; though his research was brilliant, his teaching was mediocre, and as such he could not be offered tenure. It turned out that he had no sympathy for the type of teaching practiced at the business school, which he felt was a waste of time, and he had received no hints as to its possible merits. Thus we had to derive the justification for the case method on our own. At last we had a breakthrough, he understood, and then made a remark I still remember. “You know, Jim,” he said, “the one thing no one ever talks about at the local country club is why golf is such a wonderful game.”

It is clearly in our own institutional self-interest to build community understanding of why university learning is such a wonderful game. I note with interest that the new model for Melbourne

includes a third strand in the helix—knowledge transfer to the community. But it is not simply knowledge that we need to transfer; it is an understanding of the process that generates that knowledge, and that is in many ways more wonderful and significant than any of its individual products. The discipline of mind and the tools of inquiry that we inherit from the medieval university, and that this academy ultimately inherited from the philosophic schools of Periclean Athens, are what define the university above all. Students who graduate should have had their mental furniture transformed through contact with this discipline and these tools, contact that involves actually using the techniques that produce the knowledge that university faculties house and inculcate.

How will we know if we have succeeded? We need to use these same tools of inquiry in an ongoing exercise in self-scrutiny and reflection. We need research on teaching and learning in our own institutions and across institutions. Perhaps Harvard and Melbourne could even partner in such an enterprise. But our students will also help us if only we let them into the game. I remember the moment when I realized how one might distinguish between content and process, between the “what” and the “how” of education. It occurred while reading a student’s final examination in a course on modern European cultural history. “Other than to cause massive destruction, the First World War did little to alter Europe’s cultural landscape,” I had written as the exam question. “Agree, disagree, or qualify.” “This is a silly question,” the student wrote in reply, and proceeded to explain her critique before asking another, better one. Her response perfectly illustrated the ability to discriminate among productive and less productive questions that marks a good researcher, while her use of evidence showed good judgment. This was someone, I concluded, who had genuinely grasped the meaning of inquiry. On the basis of her dissent and, even more, of her question, I gave her top marks for the course, convinced that we had both succeeded—she as a student, I as a teacher—belonging to the company of educated women and men.