# Why do Specialized and General Education Need Each Other?

穆倫

Alan T. Wood

Author's Correspondence Information
**穆倫 Alan T. Wood**
Professor Emeritus
School of Interdisciplinary Arts & Sciences
University of Washington Bothell
18115 Campus Way NE, Bothell, WA 98011 USA
Email: awood@uw.edu
DOI:10.6360/TJGE.202312_(32).0005

Submitted Date: Aug. 30, 2023; Accepted Date: Dec. 14, 2023

The short answer to the question posed in the title of this essay is that specialized and general education need each other because their relationship is complementary. Specialized education is a process of analysis. It breaks complex knowledge down into bite-size chunks we know as disciplines. It is vertical. General education is a process of synthesis. It puts disciplinary pieces into interdisciplinary wholes. It is horizontal. Analysis is necessary to identify problems, but synthesis is necessary to solve problems. Just as the terms "inventory" and "invention" share the same root word, mastery of inherited knowledge (inventory) is the first step in learning, but by itself is insufficient because the interconnected world is constantly changing. Adapting to those changes with wisdom and compassion requires creativity and imagination (invention). Mirroring the two hemispheres of the human brain, analysis is the realm of rational intelligence; synthesis is the realm of creative, emotional, social, and moral intelligence. Like the brain, which requires the integration of both these two hemispheres to form the integrity of the whole, a successful education requires both analysis and synthesis. The challenge of complementarity, of course, is to find an appropriate balance between the two and then to maintain that balance among the three constituencies who have a direct interest in the relationship of specialized and general education: society as a whole, individual students, and the university itself.

## The interests of society as a whole

Society needs specialized education to satisfy the short-term need for people trained in practical skills in a constantly changing economy. Society also needs general education to satisfy the long-term need for an educated public that possesses knowledge, wisdom, and social and moral responsibility. Traditional and modern China, and the traditional and modern West, all manifest this complementary relationship between these two perspectives, as well as the difficulty of finding an appropriate balance between them. Education in traditional China had perhaps the best balance of all because it selected an administrative elite by a series of rigorous examinations that required mastery of a literary, artistic, and philosophical tradition but also posed very practical problems. The strength of this system was to create perhaps the best overall system of governance in the world for two thousand years, as well as to foster unity and stability in Chinese society.

In the West, formal and university education also arose in response to the needs of society at large. By the later Middle Ages, a revival in the European economy and

in the Church called for a new educated elite. Until the nineteenth century, the curriculum was centered on the liberal arts. Then the Industrial Revolution changed everything by requiring a whole new set of specialized scientists, engineers, and workers capable of managing a rapidly industrializing economy. The biggest change took place in the scientific research institutes in Germany, which became the model adopted by major research universities in both Europe and the United States. After the Second World War, scientific competition between the Soviet Union and the United States in the Cold War accelerated the growth of specialized scientific research in American universities. The purpose of the modern university in both Europe and the U.S., and then the world, became singularly focused on providing the specialized training necessary to serve the short-term economic and scientific needs of society, to produce students, in other words, who could find immediate employment when they graduated. By focusing exclusively on the short term, however, they often lost sight of the need to prepare individual students adequately for the long-term challenges of life, preparation that can only be provided by a general education.

## The interests of individual students

Most students—and probably their parents as well—see a university education primarily in terms of job training. There is nothing wrong with this goal. It is better to have a good job than not to have a good job. But it overlooks three very important purposes of education that are difficult to measure but essential to the long-term success of students. The first, for lack of a better term, is wisdom. The second is personal enrichment. The third is adaptability.

Wisdom is useful for two practical reasons. First, even at the lowest level of employment, the level at which most recent graduates enter the workforce, one must deal with people. Responsibility for managing people, moreover, increases over time, while the importance of the academic knowledge learned in the classroom decreases. Second, the higher that one rises in an organization, the greater the complexity of the problems. Problems in the real world are not neatly divided into disciplines. They are messy, complicated, complex, dynamic, and wholly interdisciplinary. Dealing with people and problems requires wisdom and good judgment. Good judgment, in turn, is a function of social, moral, emotional, and creative intelligence. It is cultivated by general education, not specialized education. It requires preparation and training in critical thinking and in communicating ideas clearly and effectively. It requires compassion, patience, tolerance, and humility. It requires integrity, because without integrity one cannot build trust, and without trust the parts of an organization cannot cooperate.

The second purpose—personal enrichment—is a testament to the transformative power of a broad general education that introduces students to a lifetime of joy and appreciation of literature, art, music, and travel. It cultivates, as well, an awareness of the magnificent diversity and wonder inherent in the natural world. It explains why I have noticed over the years that most of my colleagues at research universities tend to send their own children to small liberal arts colleges rather than to research universities like the one they themselves work in. They value a general education for their children because they know it better prepares students for a lifetime, not just for an entry-level job.

The third purpose is to prepare students to adapt to a workplace environment that is constantly shifting. Because the pace of technological change is now so rapid, and because the economic and political forces of globalization are so unpredictable, many students will need to change their career trajectory several times in their lifetime. If they are prepared for only one specialized career, they will be at a disadvantage when those jobs disappear. The more diverse and general their education has been, the more flexible they can be in adapting to the unforeseeable changes they will inevitably face in the future.

## The interests of the modern university itself

If my overall model of the complementarity of specialized and general education has any merit, it would apply not only to meeting the educational needs of society and individual students, but also the university itself. The mission of the modern university is to preserve, transmit, and discover knowledge. Preservation and transmission refer to knowledge inherited from the past. Discovery refers to the invention of new knowledge. The first two are functions of analysis, breaking complex knowledge down into disciplines that are located in departments and transmitted through a process of teaching. The third is a function of synthesis, of seeing connections between the parts in a completely new way through a process of research. To serve these goals, the modern university has become a complex bureaucracy, and therein lie its greatest strengths and its greatest weaknesses. Both strengths and weaknesses are inherent in the nature of bureaucracy itself. They are a package deal. To maximize the strengths and minimize the weaknesses, and to understand how the complementarity of specialized and general education can better facilitate the university mission of innovative research, one has to understand the nature of bureaucracy.

The strength of bureaucracy is its ability to do extremely complex and routine tasks. It is a veritable miracle of human organization, itself the product of a constant

process of innovation to grapple with newly emerging and ever-more complex problems that began when humans first settled in cities ten thousand years ago. Bureaucracies promote process, fairness, hierarchy, stability, efficiency, and predictability. A bureaucracy has to have a clear process that everybody understands, it has to be fair and equitable so that people believe in the system, it has to be hierarchical so that every single task doesn't need to be endlessly negotiated, and it has to be stable to promote efficiency and predictability. Those are all enormous benefits, and before we start talking about the drawbacks, it is worth emphasizing those benefits. They are real, and we couldn't live without them. We depend on them for our very survival.

There are three drawbacks to bureaucratic structure. The first is a weakness in dealing with rapid change, both of which require completely different responses and skills. Rapid change requires initiative and decisiveness at the lowest possible level because there is no time to follow normal procedures. It requires flexible, bottom-up decision-making that is responsive to whatever is happening on the ground, but bureaucracy is, and has to be, a top-down structure.

The second drawback is that although bureaucracies were created in the first place to solve problems, the problems change faster than the bureaucracies. Bureaucracies favor the status quo and resist the disruption required to adapt to change. The third drawback is that all bureaucracies have a low tolerance for failure. They are inherently risk-averse. Innovation, however, requires risk because it is doing something that has never been done before. Risk, in turn, invariably results in failure. To be successful in the long run, therefore, one has to fail in the short run. The fundamental rule of all evolutionary change, as Charles Darwin noted, is diversify, select, and amplify.

It is no surprise, then, that most of the breakthrough innovations in the Scientific Revolution took place outside the university, just as most of the breakthroughs in recent computer technology have taken place outside the university and outside the bureaucratic structures of existing companies. Innovation requires freedom, but bureaucracies favor control. Innovation doesn't follow the rules, but bureaucracies live by rules. Innovation requires disorder, but bureaucracies thrive on order and process. Innovation is disruptive, but bureaucracies abhor disruption. Last, innovation does not obey hierarchy, but bureaucracies cannot function without hierarchy. There are strategies, however, that universities can employ to encourage a greater degree of innovation.

Several years ago I happened to attend a "blue sky" exercise by the Board of Regents of the University of Washington on how to facilitate just that kind of fun-

damental innovation in the sciences. For this exercise, they invited a sociologist from the University of Wisconsin, J. Rogers Hollingsworth, to give a presentation on possible strategies to accomplish that goal. His presentation was a revelation to me. At the time I was starting to write a world history that surveyed the full spectrum of breakthrough innovations in the ideas and institutions of all human civilizations over thousands of years of time, and at the same time I was involved in founding a new campus of the University of Washington that was constantly dealing with the everyday reality of academic bureaucracy. Hollingsworth recommended strategies that made perfect sense to me both from the perspective of the vast panorama of human experience I was thinking and writing about, as well as my personal experience dealing with a very large bureaucracy.

First of all, he said, innovation requires small size. When university departments and labs get big, people tend to associate only with their fellow specialists. They create disciplinary bubbles that discourage the stimulation of encountering unfamiliar ways of thinking. Breakthrough innovations, therefore, tend to come from smaller institutions like Caltech or Rockefeller University where faculty interact with many other disciplinary perspectives. Hollingsworth had made a study of Cambridge University in England to understand how they had managed to encourage scientific innovation for so long. He concluded that it was in part because Cambridge has managed to be both big and small at the same time. The University itself is really just a holding company for a collection of small colleges, each of which have a great deal of autonomy but at the same time benefit from the shared resources of the University as a whole. The need to be small and autonomous has been recognized by big businesses when they create small groups of innovators—so-called "skunkworks"—that are free from supervision by middle management.

Second, Hollingsworth suggested, encourage communication with other disciplines by simple administrative strategies of mixing up offices so faculty have conversations with folks in other disciplines, or encouraging faculty to have lunch together (in small, round tables) by providing cheap, accessible, and good food, or requiring faculty to come together every Friday for a presentation, or co-locating a bookstore with mailboxes and a coffee shop to encourage serendipitous conversation. He was in effect saying that general education—in the form of interdisciplinary inquiry—can actually enhance the ability of a university to promote breakthrough research in all areas of knowledge (including the sciences, the social sciences, and the humanities) by stimulating faculty to see potentially useful patterns of thinking outside their own disciplines. In a private conversation I subsequently had with Hollingsworth, he also mentioned that in a study of scientists who had won the Nobel

prize, he had noticed a high number of immigrants or children of immigrants. He suspected that their intellectual flexibility and ability in approaching problems stemmed in part from their living in two cultures—the one they came from and the one they are currently in. They know from deep experience that there are many different ways of seeing the world.

His third point was to encourage intellectual stimulation that crosses disciplinary boundaries by organizing curricula around fundamental—and sometimes unanswerable—problems that are themselves fully interdisciplinary, questions like what is life, what is consciousness, why do good people do bad things, what is human nature. He mentioned one successful scientific research institution that deliberately hires faculty who have not only the requisite disciplinary skills but who are also fascinated with the bigger and more fundamental questions confronting science and the world at large. The same effect could be produced by organizing faculty around very practical problems faced by the communities in which the university lives. These problems would be interdisciplinary—and general—by their very nature, but they would also enhance the connections between the university and the community in ways that would benefit both.

His fourth point was to encourage faculty to experiment, to risk failure. They need room to fail, even if it requires bureaucratic flexibility, say, by providing 5-year chunks of time away from the normal, highly competitive treadmill of academic productivity in standard disciplinary journals. Breakthrough innovation, he noted, is frequently made by folks—like Charles Darwin—who are so passionately interested in something that they keep pursuing the subject regardless of whether they succeed in any conventional way. In spite of frequent failure, they persist.

Above all, Hollingsworth said, communicate, communicate, communicate. It is communication across disciplines, across cultures, across all barriers, that drives the human impulse to understand and to invent wholly new ways of looking at the world. Innovation is about making connections, seeing patterns in the complexity of the world around us, being able to see the whole when everyone else can see only the parts, and being both disciplinary and interdisciplinary simultaneously. Society, students, and the university all benefit by understanding specialized and general education (and research) as a complementary whole.

## Epilogue

There is one last service that general education can perform—perhaps the greatest of all—for society, for the university, and for individual students who are all,

whether they know it or not, citizens of the world. That world has been transformed by modern technology. For thousands of years, the problems that humans faced were local. Those days are over. The challenges confronted by the human family now are global for the first time in the history of human civilization: climate change, disease, nuclear proliferation, crime, food and water shortages, environmental pollution, to name just a few. The potential for disruption of just two technologies alone—genetic engineering soon capable of designing a new human species, and artificial intelligence soon capable of exceeding the power of the human brain—are literally unimaginable and raise the most profound questions about what it means to be human.

Given the scale of the challenges confronting the human family, the university has an increasingly vital role to play in the modern world. It is the custodian of all human knowledge. It presides over an ocean of human experience into which all the rivers of world culture have flowed since the beginning of time. As such, it has a responsibility to assume a role of intellectual leadership commensurate with the breadth of that knowledge. To provide that leadership, however, the university needs to expand its overall mission from being merely a vehicle of specialized disciplinary knowledge to being a beacon of wisdom to a world desperately searching for answers to the most fundamental questions of life and human destiny. That mission is quintessentially a function of general education.