

Throughout the 20th century, independent schools served their students and nation in exemplary ways. One could easily find stellar instructors, solid coursework, fine facilities, and strong extracurricular activities at these schools. Their students were often first in line to be accepted to prestigious colleges and universities, and their alumni were in the ranks of those who served their nation and local communities with distinction. There was a sense of creating the well-rounded student, highly versed in the liberal arts and proud of his or her accomplishments on a sports team. Faculty members accepted their dual roles as teachers and coaches. It was an era of relative comfort, with trustees and heads of schools preserving tradition, while modestly adding innovation.

Missing from that positive image of independent schools was an institutional lens focusing on issues that were dramatically transforming society, and, in particular, its educational component. The long overdue and great social upheavals for the rights and privileges of minorities and women blanketed the concerns of a great many institutions before they appeared, literally or figuratively, in the boardrooms or on the doorsteps of independent schools. Public schools faced court-order integration, and the resultant exodus, or better known as “white flight,” found its way to willing-to-accommodate private schools, both independent as well as newly formed “Christian schools.” The integration battle, with its strong racial and equity components, was fought in the public school, with private schools sitting relatively comfortable on the sidelines. For the next several decades, independent schools should have asked, “As leaders, how was it possible that our educational and moral compass did not anticipate the civil rights and educational changes in society, and why didn’t we become engaged at the onset? What else will we, as independent schools, miss by virtue of not knowing or properly aligning ourselves with critical, emerging movements?” Anticipating, knowing, engaging, aligning, or rejecting emerging 21st century educational issues, especially in the international realm, will be powerful determinants in the success or failure of independent schools.

Despite the often closeted aversion by school heads to business models, many independent schools are seeking to incorporate relevant change elements that reside within the context of management and leadership publications, such as Jim Collins’ book, *Good to Great*. Those exercises are highly commendable, but the quest must be a far more transformational design. The concept of school “independence” often leads to a parochial defense of “adamant autonomy” and self-proclaimed “greatness,” in lieu of confronting the essence of what it will mean philosophically and structurally to enter the school “greatness” category in the near future. It is also obvious that once in that category, it will be difficult to remain, given the array of potentially excellent educational models that will actively compete for teachers, students, resources, and dominance.

Independent schools have long been the perceived masters of the supply side of the education equation. Will that hold true for the early 21st century? What will be expected from the demand side that includes colleges, graduate schools, and the job market? The answers to that question may well change the design and operations of a K-12 learning community. Although I believe that top colleges, graduate schools, and/or the business realm will mandate some of the following, it would be far wiser and more accurate to gather leaders from those fields for challenging and on-going dialogues. I envision that the demand side will recommend that

- High school students should be well on their way to becoming independent thinkers. That independence will emerge as students gain progressive mastery of subject matter, recognize the interrelations of diverse fields of study, and pursue guided independent research. However, that must occur within the context of being immersed for years in the process of intellectual inquiry and academic questioning. Independent thinking is also correlated to the freedom that emerges from a highly disciplined mind, akin to an exemplary dancer who is able to demonstrate stunningly difficult and innovative techniques due to having a highly disciplined body.
- High school students should have a deep and working understanding of the applications and transformational powers of technology, within and outside the classroom. The impact of technology will increase exponentially in the near future, changing the very essence of what constitutes the global society. As such, the absence of polished skill sets and related forms of inquiry in technology will decidedly limit the potential of students to enter and to succeed in their desired fields of study. After I completed the writing of this paper, and on the recommendation of several acquaintances, I began to read Thomas Friedman’s book, *The World is Flat*. I was struck both with the realization that my thoughts may at best be mere footnotes to his extraordinary work, and that it is essential for K-12 communities to engage, as soon as possible, in logical but passionate debate on the flat world thesis. As such, I strongly recommend that parents, students (as appropriate), faculty, and board members read *The World is*

Flat and extrapolate many of Friedman's contentions to K-12 education. It should have a most stimulating and humbling effect.

- High school students should understand and demonstrate how knowledge could be transformed to practical applications. That may be a key component in what will constitute an educated individual in the 21st century.
- High school students should continue to take a plethora of AP's to satisfy college admissions standards. Interestingly, while that is glibly declared, college faculty members are often opposed, for many legitimate reasons, to having those students opt out of basic college courses, particularly in science and math. The supply side of the equation, namely high schools, publicly tout the benefits of AP's in terms of cost savings at college, while privately acknowledging the limitations of the AP program. It is time for the demand side of the equation, i.e. the colleges, to eliminate or dramatically revise the AP's, with direct and welcomed collaboration from top high schools. The AP game should end!
- Students should be highly literate in foreign languages, as well as in the languages of mathematics, technology, and sciences. As such, independent schools should consider which foreign languages would best serve their students 10-15 years hence. I would suggest having Chinese, Japanese, and Spanish courses at all grade levels, with fluency as a characteristic of an educated high school graduate. Although the demand side will continue to recognize the inherent value of a strong liberal arts education, increasingly greater value will be placed on those whose knowledge and use of the humanities is highly complemented by understanding and fluency in foreign languages, mathematics, science, and technology.

Although this essay is focused primarily on the life of the mind, the future of a global society is dependent on harnessing intellectual skills to the advancement of that which is good for the welfare of this planet. The school years must imbue within each student a sense of being part of a collective stewardship for this continually fragile planet that is indeed borderless when viewed from space. We do need what Buckminster Fuller called an "Operating Manual for Spaceship Earth," and that will be the quest by reasoned leaders on both the demand and supply side of life's equation during the 21st century. I hope that our schools will foster that mindset and service component among all of their students.

At the heart of this article is a challenge to independent schools to break their often rigid molds, or, at least, to critically re-examine their values and practices. Although I hold independent schools in high esteem, it is essential for those institutions to look at a somewhat different educational paradigm based on a far greater role of science in the overall culture of the school. Our failure to do so may be at our peril, perhaps somewhat akin to our failure to embrace and learn from human diversity in the latter decades of the 20th century. I hope that my thoughts will provoke a bolder and more iconoclastic dialogue among independent school leaders.

Changing the Matrix

1. Independent schools are to be admired for their near endless refinement of components of education. However, much like the universities, that refinement tends to yield elegant, individual silos housing different departments and/or divisions of the school. In turn, that creates the component mindset within faculty members and administrators at a time when we must explore the implications of new curricular designs that may level or dramatically rearrange the silos, readdress the priorities of subject matter, and necessitate changes in school culture. Generally, the only interdisciplinary individuals at a school are the students. They willingly take a wide range of subjects because we require them to do so, often without any understanding on their part or ours of how those subjects are or should be linked. If subject linkages are done effectively, will that yield greater insights, more inquisitive minds, and better academic questions for all involved? Given what we know today and anticipate for tomorrow about the universities, international education, jobs, and society's needs, would we build and maintain our silos and schools in the ways they look and function today?
2. The dominant culture within most, if not all, independent schools is the humanities, not the sciences. Our graduates read and write quite well, but they are NOT bilingual, simultaneously embracing the logic of the sciences and the values of the humanities in confronting critical national and international issues. Students AND their teachers must acquire a scientific fluency and a comfort level in being lifelong learners in a wide array of scientific fields. The culture of independent schools must tilt in favor of the sciences for all students, not just the elite few. The issue of the balance or imbalance between two academic cultures, science and the humanities, has its post World War II intellectual origin in C.P. Snow's *The Two Cultures*. Although he was too consumed by the glories of science while belittling the realm of the humanities, Snow's arguments, in perhaps a more balanced fashion, deserve serious dialogue at every independent school. My contentions should not be construed as a mandate to abandon the humanities or relegate them to insignificance. The humanities must remain a vital part of a student's education and

thought process. However, science and the humanities must become the heads and tails of the American educational coin, in an endless balance of integrated and coherent thought.

3. High stakes international competition will be in the areas of science, mathematics, and technology. This contention, if accepted, should alter the design of our schools, if we expect our graduates to compete and succeed against stiff, if not often better, competition in other nations. I would presume that those who serve on independent school boards would encourage, if not demand, analysis and, if appropriate, systemic academic changes.
4. No independent school is led by an outstanding scientist, and certainly not a Nobel Laureate in science. “Impossible” would be the chorus of heads of schools and their boards! However, a public high school in Illinois (the Illinois Science & Math Academy) was designed and is led by a Nobel Laureate in Physics, Dr. Leon Lederman, an active researcher and the author of *The God Particle* and *From Quarks to the Cosmos*. Regularly at his school, students have “lunch with the laureate,” during which time a vast array of scientifically related topics are discussed. I would suggest that independent schools should have accomplished scientists as key administrators. This alone would dramatically change the culture of the school, while fostering new and different approaches to how the school should plan, analyze, and formalize programs that would enable us to compete effectively against any school system, in both the sciences and the humanities. It is a type of thinking and leadership relatively unknown to independent schools.
5. A new school model must embrace an enormously valuable and available resource, namely retired physicians, scientists, and mathematicians. Many would willingly act as assistants in science classes and labs, providing an expertise unknown in K-12 schools. Rather than actually teaching classes and maintaining student grades (although some may indeed want that role), these “assistants” would present lectures, dialogues, and seminars, as well as lab experiments, that would provide greater clarity and expertise in a wide array of scientific subject matter. In particular, the study and understanding of the biological sciences would be advanced well beyond current practices. These professionals would be the “vanguard” of the cultural change that must take place in schools. Also, these assistants could work part-time, at relatively modest compensations. (Out of their own generosity, many may refuse payment.)
6. For a school to maintain a culture of science, the laboratory must become less ominous, more sought after, and certainly more time-friendly for student exploration. As such, a school should have many small labs where clusters of students could pursue experiments over months, if not years, without disassembling the equipment. Labs should also be open to student use during early evenings, weekends, and vacation times. Monitoring issues should not be the obstacle to student learning.
7. With adequate time and equipment rich labs PLUS the expertise of research scientists (either full, part-time, or adjunct), a model school should be able to successfully compete and win notable recognition at every national and/or international science competition.
8. The model school would revamp the science curriculum, using a physics, chemistry, and biology sequence, rather than the traditional biology, chemistry, physics cycle in middle/high school. The proposed sequence is logical for a host of reasons too long for this article. (See the curriculum rationale and program by Dr. Leon Lederman.) In lower schools, all students must be taught fundamental concepts of physics, chemistry, and biology and other sciences in integrative ways, in addition to utilizing thematic approaches with the humanities, physical education and athletics, and other courses and extra-curricular activities. Hands-on and inquiry science for children are essential for later scientific exploration. The difficulty would be working with lower school teachers who have little or no background or understanding of the sciences, except for the “handouts” that they acquire and dutifully use. Schools must provide science training for all elementary/lower school classroom teachers. In addition, highly versed “floating” scientific advisors should be hired and provided laboratory space and greenhouses at every elementary school.
9. As for a longer school year, it is essential that independent schools take the initiative and expand their teaching days to a minimum of 210-220 days. For learning retention, it should be longer for elementary school children. In the *Once and Future King*, Merlin reminds young Arthur that it would take several lifetimes to master an academic discipline. Our students and teachers need more time to learn, exchange, explore, risk, and to learn again. In addition, there will be NO success in international competition if we do not match teaching time with our leading competitors. I doubt if they would reduce their school year to accommodate our educational and recreational desires.
10. The majority of faculty should be placed on twelve-month contracts, thereby significantly increasing salaries. The summer responsibilities would be on a three-year cycle, with one year devoted to professional development, one year to curriculum refinement, and one year to independent projects with students. Faculty would receive vacation time during one month in the summer, in addition to the schedule breaks during the academic year. This would be particularly helpful in recruiting and retaining top science teachers in a highly competitive market.
11. A professor of mine once declared that all students should walk on jello in order to grasp the concept of academic uncertainty. Far too many independent school students simply want to know the “answers” to the tests, and will read

the grade and ignore the teacher's comments. I would suggest that the format for a few final examinations should be rather simple. The key question would read, "Given the insights you have gained during the semester, what three challenging questions would you pose for further exploration leading to a possible journal article? Simply state the questions and indicate how you would proceed with the research. Your grade will be based on the level of sophistication of the questions posed." Perhaps, I am greatly influenced by the story attributed to Isidor Isaac Rabi, the 1944 Nobel Laureate in Physics. When asked to whom he attributed his notable scientific success, he replied, "my mother." He elaborated by indicating that rather than asking him if he had a good day at school, she would always ask, "did you ask a good question today?" Finally, he related, "I asked a good question!"

12. I have long argued with NAIS that greatness or excellence cannot be proclaimed unless independent school practices, outcomes, and ideas are presented in a scholarly journal for discussion and critique by other educators and interested parties. The NAIS magazine appears to be a forum for advertising, storytelling, and anecdotal tales. That format tends to protect interest and rhetoric, rather than advancing thought, best practices, and research modes.

What additional variables could make the proposed model of schooling innovative and potentially highly successful? The answer resides in the creation of a new structure of governance forged from the collaboration of K-12 and higher education. The time-honored concept of educational governance has been a board of trust for K-12 and a separate board for post secondary or higher education. Over generations, each board has refined the philosophy and strategic planning for each realm of education. Both have, unfortunately, failed to grasp the necessity for a "linkage board" between K-12 and undergraduate/graduate studies. The only way that K-12 will be able to compete successfully on a world's playing field will be to link in new and highly collaborative ways with the university, and the only way for the university to ensure an extensive pool of highly educated high student graduates able to compete with the best in the world will be to link with K-12. This cannot be done through casual meeting between high school college advisors and university admissions officers. Instead, it must be accomplished by creating a new governing board consisting of highly talented members of both sectors. The models of the present and past are simply not capable of providing the excellence and greatness necessary for the intellectual leadership that will be essential for our nation's welfare in the future. The near term dialogue should be how to design a new model of governance that will preserve the autonomy of each educational sector, K-12 and the university, while connecting both sectors in a determined, collaborative, accountable, and enormously successful manner. It will require new thinking to create this 21st century paradigm for American education

What are the consequences if this new governance structure and related model of education do not evolve within the next two decades? I would speculate that the answer is, at best, unsettling. In their continued quest for excellence, the "great" universities will seek to become more international at every level, gathering the finest talent and available financial resources from wherever they exist. As such, vast numbers of undergraduates (in addition to graduate students) will be recruited from countries with very accomplished high school graduates who have reached academic plateaus in science and mathematics far beyond those of their U.S. counterparts. Many of those students will also be associated with families, cities, and countries with discretionary wealth that will be used to obtain educational superiority at the global level. The quest will be to have their students matriculate at the finest universities in the world, and a significant number will be located in the U.S. for the foreseeable future. The logical consequence of this scenario will be a dramatically reduced admission of American students, including those at independent schools, to the most prestigious American universities.

In the long term, independent school students must actively compete for spaces at the finest universities in the world, and, indeed, many will be in places distant from our shores. Within the lifetime of current K-12 students, I would anticipate a host of highly esteemed universities in Asia (and the course work will not be given in English!). Educational opportunities will be increasingly delivered electronically, especially to those who are skilled enough in languages and technology to take advantage of those options. Independent schools will change dramatically in student composition, faculty skill sets, and the very design of curriculum and desired outcomes. An "independent" school will be a misnomer, for all education will become increasingly interdependent, and a "great" school will be at the confluence of that which is best in current and emerging linkages.

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