

A Difficulty in the Concept of Educational Sustainability

Steven Loomis, PhD

Associate Professor of Philosophy of Education (Retired)
Wheaton College Graduate School
501 College Avenue, Wheaton, IL, USA 60187

John Gunderson, PhD

Teacher, Dana Hills High School
33333 Golden Lantern Dana Point, CA, USA 92629
Adjunct Professor, School of Education
Chapman University
1 University Drive, Orange, CA, USA 92866

Paul Spears, PhD

Associate Professor and Director of Torrey Honors Institute
Biola University
13800 La Mirada, CA, 90806 USA

Doug Grove, PhD

Associate Professor and Director, Graduate Program in Education
Vanguard University
55 Fair Drive, Costa Mesa, CA, USA 92626

Abstract

A free and civil society's sustainability, as well as the proper functioning of its social institutions, pivot on the quality of its system of education. A quality system of education provides reliable dissemination of knowledge, skill, and moral and intellectual virtue among a citizenry. Yet information priorities, patterns, and the rules generated by 'maximal institutionalism' threaten the conditions necessary for that sustainability. Our thesis is that, within a technical model of production, particular, heuristic and tacit information, that is, the kind of information bound up with the individual person and local community and culture, is divided from and comes to be displaced by standardized information. This information loss impairs production of the education good (i.e., quality education), thus diminishing the creation of human and social capital. If this is correct, the strategic institutional question that surfaces for a nation-state and its education system is what kinds of particular information need to be preserved or reintroduced into production in order to provide individuals (near) optimal conditions for their development and flourishing, conditions that provide to a community or to a nation-state strategic advantage in competition under conditions of scarcity. Solutions will look different over different time horizons and cultural contexts. Authors recommend to researchers, policy makers, and leaders the use of institutional analysis to arrive at meaningful strategic questions that might help lead to plausible solutions to information imbalances plaguing educational production. Authors illustrate with examples and discuss implications for the international audience.

Key Words: sustainable education, effective teaching, institutional theory, social choice, economics of information, civil society, schools of education.

Introduction

The trajectory of a nation-state's system of education is more or less one of the most important issues facing its sustainability. It is generally agreed and known at least since the philosopher Plato that a society goes the way its education system goes. From the early Hebrews, Greeks, Chinese, Egyptians, and Romans, on up through the present day, the institution of education is intertwined with the success or failure of a civilized society and, since the late Renaissance and early Enlightenment, the modern nation-state. A society's ability to renew itself inter-generationally requires cognizance of what to bring in and what to discard from the past, what to pursue in order to advance the frontiers of knowledge, what to change or see differently in order to identify and sustain its values, virtues, and preferences, and to efficiently and effectively meet existing and anticipated social, cultural, political, and economic challenges.

These challenges are confronted collectively, but their negotiation relies on the development and flourishing of individuals within society. It is the individual human being that is the central complexity and predicament for these communal entities. The individual human being is the criterion on which an organization, a system, or an institution is evaluated. The benchmark is attending to the individual as an irreducible entity,¹ someone whose identity is his or her own and yet shared with community (ies), an identity that ought not be sacrificed to the totem of technical procedures such as new forms of Taylorism.² Does the particular individual student in a school or university access and achieve the opportunities available to him or her? Does the individual human being in society possess the freedom, the width and breadth to develop and flourish, to realize his or her attributes, talents, gifts, and capacities? Or does society—it's structures or institutions—somehow foreclose options for one, or for some, or for many, and thereby inhibit individual human development and flourishing? This is what scholars mean when we speak of social progress: satisfactory answers to complex social choice questions concerning the individual and the group (cf. Arrow 1963; Sen 2011).

What ultimately receives agenda in the schools and, to some extent, in higher education, is what the debate is about. The debate is over how to constitute and sustain a mass or scaled education system that helps to preserve and renew democracy and republican forms of government, their essential commitments and principles, their respective institutions, within the limited resources necessary to do so, all the while promoting opportunities for individual development and flourishing. The debate is over the individual-collective problem, the problem of the one and the many. The debate, then, is over institutional questions, on how the institution might optimize information conditions for the development and flourishing of each individual human being, thereby sustaining social progress. It is a debate on which civilization hangs.

The Institutional Question and Lens of Analysis

If this logic is correct, if the free and civil society's sustainability turns on these questions, then why has there been so little genuine institutional analysis used in educational research and policy formation?³

¹ We do not here provide an ontology of human persons. Rather, we argue from (not to) the inherent worth or value of the individual, proceeding throughout our argument from this warranted presupposition.

² Fredrick Taylor, *Principles of Scientific Management* (New York: Harper, 1911). The Taylor system engendered four general principles, which can be linked to our contemporary system of schooling and teacher preparation performance: 1. Replace rule-of-thumb work methods with methods based on a scientific study of the tasks; 2. Scientifically select, train, teach and develop the most suitable person for each job, rather than leaving individuals to passively learn the craft on their own; 3. Managers must provide detailed instructions and supervision to each worker to ensure that the work is done in a scientific (efficient) way; 4. Divide work between managers and workers. The managers apply scientific management principles to planning and supervising the work, and the workers carry out the tasks. See Raymond Callahan, *Education and the Cult of Efficiency* (Chicago: University of Chicago Press, 1962), p. 31.

³ In this article we are studying the institutional environment of education that helps to form the framework from which human decision making and action take place; in the words of Douglass North, essentially the "rules of the game" that guide participant thinking and behavior. For key works, please see Douglass North, *Institutions, Institutional Change and Economic Performance* (Cambridge: Cambridge University Press, 1990); Samuel Bowles, *Microeconomics: Behavior, Institutions, and Evolution* (Princeton, NJ: Princeton University Press, 2004); Richard Nelson, *Technology, Institutions, and Economic Growth* (Cambridge, MA: Harvard University Press, 2005); Jacob P. Rodriguez, Steven R. Loomis, and Joseph G. Weeres, *The Cost of Institutions: Information and Freedom Expanding Economies* (New York: Palgrave Macmillan, 2007). In this essay we are drawing a sharp distinction between a singular organization, a school or school district, and the wider

For example, the celebrated *A Nation at Risk* report (1983) in the United States correctly recognized that the quality of education was central to the economic and political future of the U.S. and its people. The report's authors, however, erred by focusing on solutions that principally drew from standardized information (e.g., standardized areas of knowledge, standardized goals, standardized tests, uniform accountability rationales, thus narrowing education practices-methods-experiences, and thinning conceptions of what counts as 'value-added'⁴), otherwise conceptually and pragmatically blind to the value and importance of non-standardizable information represented by, for example, the individual teacher, the individual student, and the individual school principal, as well as the student's family, and local culture and community. To demonstrate the resiliency for such policy positions, as represented by the *A Nation at Risk* report, President Obama's Secretary of Education, Arne Duncan, makes basically the same argument, nearly thirty years later, in the journal *Foreign Affairs* (2010).

In many ways the authors of *A Nation at Risk* divided the information environment of the institution, which simply means that they separated what could be standardized and made legible from what could not be, emphasized the former and thus narrowed the range of proposed solutions leading to quality schooling. The report's philosophical position represented an updated version of Essentialism, which invests scarce resources in the common transmission of discrete facts but is void of having teachers and students consider deeper human values and develop critical thinking skills and use of reason. It was, on the whole, an effort to discover magic bullets (and easy solutions) to what economists call a universal production function or a production technology. The approach attempted to achieve a too easy coexistence of disparate ends. On the one hand, Standards movement reformers in the U.S. sought to make production inputs and outputs⁵ more uniform, almost completely standardizing the information environment of schools, and abstracting the school teacher and principal (or heads of school) to a mean or average performance. Using the Bell curve tied to the concept of proficiency, education reformers in the U.S. began to use analytics to regiment efficiencies in curriculum, textbooks, methods, testing, and the organization of work in order to wring out, it was thought, a reliable output proxy: the test score. And ample economic incentives arose for educators to map their work almost entirely to test score improvement.⁶

To achieve system efficiencies in the schools Standards reformers argued for lowering the costs of production through processes of standardization. Of course, it is well known that control over these kinds of social processes intensify during hiccups and breaks in the economy or in challenging political circumstances, occasions of risk driven by a punctuated turnover in the institutional rule structure that produce, eventually, highly attractive incentives for people to follow. The perception of the Soviet threat to U.S. interests after the launch of Sputnik in 1957 led to emphasis of math and science curricula and federal dollars flowed to fill this 'gap' in knowledge.

rules represented by the institution or system of education.

⁴ When education as a large institution, or as a process, is reduced to a utility function, ideas like "value-added" are logical effects. It is a relatively simple but important concept used by social scientists to try to quantify the "value added" in receiving, in this case, an education. The value-added approach has bitten across the institution of education in the U.S. and relies on a cost-benefit analysis of the outputs of schooling and higher education. Its genesis originates in business models and their so-called production functions (the economic relation of inputs to outputs). A positivist and empiricist commitment to verification is at its core. Actually, the real problem is more threatening than positivism and empiricism. The process starts with positivism (only the real is measurable) and then moves toward positivism in the inverse (only the measurable is real). Its technical environment turns the optimal institution (where a human equilibrium is maintained between individual and community) into a maximal institution (where an information distortion occurs that biases the impersonal collective), which becomes the social determinant that leads to the unsustainability, even abolition, of education in the old sense, the traditional meaning of education (knowledge, skill, and the intellectual and moral virtues), and sustainability of education in the new sense (mere information dissemination and educational attainment). The maximal institution severs reality from day-to-day production concerns. Under extreme versions, schooling no longer matches the real world.

⁵ Educational inputs may be interpreted narrowly or broadly, but may include adequate public expenditure per student, length of the school year, a quality liberal arts, vocational, and physical education curriculum, relevant textbooks, a quality teacher with decision-making authority, quality, dynamic, and complex exchanges between student and teacher, effective school leadership. Outputs or outcomes often include the standardized test score, labor market wages, educational attainment. For a fine discussion of causality of inputs to outcomes, from an economic point of view, please see Lisa Barrow and Cecilia Elena Rouse, "Causality, Causality, Causality: The View of Education Inputs and Outputs from Economics," a paper prepared for the Consortium for Policy Research in Education, State of Education Policy Research Meeting, February 14-15, 2005, Federal Reserve Bank of Chicago.

⁶ See Jacob (2005), Jacob and Levitt (2002), Klein et al. (2000), and Koretz (2002).

The National Defense Education Act of 1958 was born. Incentives for universities to produce science and mathematics teachers increased. More recently, the U.S. Education Department's 2010-12 'Race to the Top's' \$4 billion is another transparent example. Attached to that money, however, are the new rules affecting how teachers perform their work, and, naturally, a further shift in the available channels of information redefining quality education. In these types of cases a kind of devil's bargain can ensue. For access to the money individual U.S. states and local school districts give up wide swaths of sovereign decision-making, including how states prepare and evaluate teachers and their students, whether to retain the rules of tenure and other endogenous professional practices and school curricula.⁷

The common motive underwriting the *A Nation at Risk* and Standards reformers was an understandable interest to inject more rigor and quality into schools' productive activities, to take central command over production decisions within the work of teaching and school management. When a business or military division or some aspect of organization is not achieving its mission, the temptation is to 'get tough' and to 'knock heads,' to secure some type of top-down reform. The impulse for the reform is often a rational one. However, the change being made can so alter and devalue the good of the entire enterprise as to threaten the sustainability of a society's institutions; the change can miss the mark by concealing or forgetting the first principles undergirding the very endeavor. In the present case, the change can shift the criterion of quality education away from the success of the individual student in a complex learning environment, and over the long run move the definition of success toward an uptick in the abstract aggregate of statistical test score averages bound up in a collective of persons. Such a change rules out the very possibility of complexity. In other words, reform of this kind can peg 'success' to a trajectory performance within the statistical mean of the Bell curve (or normal distribution), often defined as mere 'proficiency' of a pre-determined skill or knowledge area. Consequently, competition heightens around the mediocrity of a relatively low denominator and narrowed criterion for success in the test scores. What remains to be established is whether those tests reliably represent genuine learning, and whether genuine human flourishing emerges from increased societal emphasis on test scores.

The management philosopher, Peter Drucker, once said that one has to know well what business one is in. To achieve a specified good like education one has to understand with depth of insight the nature of the good one is trying to achieve, and, no less important, whether that good and the means to achieve it is complex or simple, whether the information channels are adequate to the task. Standards reformers in the U.S. thought that two goals—efficiency and quality—were inherently compatible and therefore achievable (e.g., see William Boyd 2004). This vision was derivative of a social philosophy that did not see that the information attached to the individual participant—student or teacher—was a scarce good. It failed to account for the consequential tradeoffs that existed within the social order in subjecting education to stricter forms of legibility, uniformity, rationalization, and standardization. The vision was guided by the belief that all that had to be done was to tighten the reins on production decisions, convert decision-making of participants into mere choices, square away the teachers and principals, that is, bind them more closely to the new rules of production, and give the students a one-size-fits-all standards-based curriculum. From 'Goals 2000' to the 'No Child Left Behind' Act to the 'Race to the Top' (all U.S. reforms over the last twenty years), the sequence of solutions sought to 'fix' education by removing information from and not injecting various kinds of information into the production process. The vision failed to understand that not all goods square up.

There is, when one carefully evaluates these reform efforts through information analysis, a remarkable naïveté about their path. Rarely in a knowledge institution like education does reform success turn on less information and not more (and more diverse kinds of) information. A basic truth ignored by Standards reformers in the U.S. is that the further the school is isolated from the real world (itself representing a wider set of information), the further it moves toward standardized analytics and technical model of production, ever more information is lost from the school's productive activities.

⁷ Similar tradeoffs occur in a state's use of federal financial aid, federal highway funds, in health care provisions, and in banking. With membership come obligations, absent coherent checks and balances.

Until a Nash equilibrium can be modeled,⁸ a choice must be made between zero sum alternatives: a society can simplify the model of production and make the good easier and less expensive to deliver (efficiency through standardization), or a society can make the model of production more complex and incorporate the full range of desired attributes from inputs into the final product (quality through particularization). We argue below that the policy question moving forward is defined by institutional and information analysis.

The irony is that, by dividing information *in extremis*, by leveling qualitative differences under quantitative uniformity, by instituting ever greater degrees of uniformity and order throughout formal education, the very reformers seeking to reduce social risk and institutional costs are actually increasing social risk and institutional costs across political, economic, and cultural institutions. And by adopting an organizational framework of analysis, not an institutional one, reformers cannot see that their narrowed focus on discrete pieces of information has lost the liberal breadth and interconnectedness of civilization-sustaining knowledge, skill, and subjects of inquiry. The vision of the *A Nation at Risk* authors, and the cadre of reformers who followed, including the present U.S. Secretary of Education and his functionaries, could not foresee the information loss and the consequential human costs rising within the micro and macro levels of formal education (e.g., in calibrating human worth and individual development with the test score).⁹

What reformers fail(ed) to recognize is that education as an institution may expand and become more efficient in an environment of rising costs. This is one of the most important counterintuitive truths in education today. Yet nearly everyone denies that such a thing is possible.

The standardization of the U.S. schools during the 1980s, 1990s, and 2000s was not merely insufficient to the task of reform. It turned out to be incompatible with mature conceptions of the education good, a good that requires for its achievement a more holistic and complex information environment. Said another way, instead of avoiding a further production problem within the schools, the very thing with which Standards reformers were most concerned, the movement to make the rules of production more uniform so affected the information environment that it oversimplified education and accelerated a descent or de-professionalization of educational practice. The descent of practice is exhibited most clearly in answers to the question, who (or what) controls teachers or professors work? Ingersoll (2003) asked that question and discovered power and accountability were mutually reinforcing principles. Power without accountability is license. Accountability (to others) without power, what we would call genuine or robust forms of professional causal agency, is injustice. The practice of professionals in knowledge fields weakens and triggers descent when accountability outpaces decision-making authority. It is easy to see how this is the case. Many teachers in the U.S. today appear less concerned about effective pedagogy and creative, engaged, sustainable learning, and have become more concerned with merely following ‘the book’ (the formal rules) and standards-based pacing guides provided to them.¹⁰ There is a firm belief that those rules will deliver quality education.

⁸ A Nash equilibrium (Nash 1950), in short, is where each participant is making the best decision that he or she can (given his or her interests), while also taking into account the decisions of the other participants (and their interests). Instead of a zero sum environment of win or lose, the Nash equilibrium can produce win and win bargaining solutions around some social problems.

⁹ It is useful to comment here that these reformers are not bad or stupid people. If they could apprehend the loss, using an institutional epistemology, and if they could set aside their considerable self-interest and rent-seeking behavior, course corrections in public policy would likely follow.

¹⁰ Consider findings in the McKinsey Report (2010), aptly summarized by Education Week reporter Stephen Sawchuk (2010), which supports our theory: “In general, the [McKinsey] report finds that lower-performing school systems with weaker teaching forces, such as the education system now serving the Madhya Pradesh province of India, tend to provide teachers with prescriptive curricula and pedagogical techniques to ease the delivery of lessons and ensure consistency across classrooms and access for all students to achieve basic literacy and numeracy. But systems that have mastered the basics and are striving for higher levels, like the Long Beach, Calif., district in the late 2000s, gradually give teachers and local schools more say over pedagogy and curriculum, transforming a tight central role into that of a supporting player that encourages local school personnel to use creativity and innovation to get students to reach ever higher.”

<http://daily.me.com/story/2010120800004817/global-study-tracks-common-paths-improving.html>.

However, the principle of least action (or instrumental rationality) ushers in an incentive to conserve one's energy and conform to a pathway of least cost. Aligning education production to achieve the test score is an effect not the cause of this movement.

What are the effects on teacher decision-making? It is a truism of critical importance that the intellectual work of *decision-making* requires a wider and more diverse network of information than do mere *choices*. Decision-making as a practice retains to the professional's discretion both the means *and* ends of a given activity, not a total freedom to set ends or even all the means to achieve them, but to a level that is reasonably bounded by the information environment and knowledge traditions of that specific good. For example, judges in courts of law in a free society require wide latitude in deciding cases and imposing consequences. A specific magistrate captures the informational context of a case before rendering a decision, one that seeks a complex 'good' called justice. Sometimes a legislature will curtail the judiciary's discretion in certain areas of the law for public policy reasons, thus hindering (or otherwise narrowing) a judge's information base for deciding what the law says and how it ought to be applied within the bounds of statute, the common law tradition, and *stare decisis*. The same idea is true of the medical doctor, the schoolteacher, and the college professor, as well as other knowledge workers. A specific teacher or professor owns the means of production; it exists in their minds and brains (Drucker 1999). An individual teacher or professor identifies and captures the right context-bound mix of information necessary for particular students to achieve some relevant aspect of the good. The mix involves procedural concerns over the exchange process (e.g., pedagogy) as well as the content and aims of learning (e.g., knowledge and skill). In the technical or 'maximal' institution, however, rules develop from market and government entities that can radically limit the decision-making discretion of the professional educator. Those kinds of rules not only narrow the information environment of decision-making, they divide information from the educator in such a manner as to reduce their work to mere choice-making.¹¹

Choices, in contrast to decisions, are options limited in scope and variety in order to exercise control over the means to achieve an already predetermined set of ends. This implies that educators might be permitted to select a few of the assessments or activities of learning; they might be allowed to select a pedagogy or two, but the local district or state or federal entity, or some market-based version, such as an accrediting agency—the entity ultimately making or enforcing the rules—selects the ends of education. This is what makes education a political and economic institution, not simply a cultural one. More recently, such government and market entities in the U.S. have also exercised a heavy hand in defining the means (i.e., procedures) to achieve given ends, chiefly through control over what courses may be taught (e.g., the Common Core curricular movement), what methods used to teach them, what resources and what instruments used to assess their outcomes.

The public policy shift away from teacher decision-making toward teachers having a narrower range of choices was reinforced by a gradual turnover in the rules of the broader institution (e.g., laws, administrative policies, customs and regulations, best practices). What the Standards reformers achieved was to neutralize and marginalize the power of the individual participant—the individual student, teacher, principal—by aggregating that power to the rules themselves. This move socialized risk and eliminated some of the uncertainty within processes of production. Societies in expanding institutional environments do this all the time, whether in banking, trade, housing, health care, or law enforcement. In the area of macroeconomics, the International Monetary Fund (IMF) operates in this manner within developing countries, making long-held cultural preferences subordinate and contingent (some might say hostage) to the new exogenous rules. In education, so-called 'zero tolerance' disciplinary rules are like that: they pare individual decision-making discretion from educators and school leaders in order to control risk and assert central (or commanding heights) forms of power. New, rigid rules come to embody the principle of 'fairness as sameness' and are embraced for a variety of reasons, most of all because human variation is *controlled* thereby limiting financial costs within a system. It decimated genuine education leaders, turning them into mere rule managers in order to survive. Carefully examine almost any education leadership program in a U.S. school of education today and it is not leadership being taught; it is management of the rules of production and how to efficiently integrate a specific organization into the wider rule (institutional) structure.

¹¹ For a seminal paper on rules, their variety and the work they perform, please see John Rawls, "Two Concepts of Rules," *The Philosophical Review*, 64, (1955), 3-32.

What was unfair to educators, of course, was to assign accountability rationales to the schoolteachers and principals after having weakened their decision-making authority. Doing so effectively made the professional educator and the school leader causally liable for production decisions they had little to no direct responsibility for. This fact has created an ethical problem across the institution of education. Moreover, the reformers' moves bore the unintended consequence of devaluing the complex good of education and, in varying degrees, dehumanizing its participants, endangering the genuine achievement and corollary effects of the good. These are the costs building within the American system of education: exchanging knowledge for ignorance, as one colleague put it. And here is where our philosophical and economic research method might offer critical analysis and a plausible correction.

Had the *A Nation at Risk* authors used an institutional method of analysis, in that way evaluating the rules and their effects on the information base of production, researchers and scholars at the time would have had a research pathway, an epistemology, a theory of knowledge, by which to engage a much wider range of research questions and policy solutions to the problem of quality education. Schools of education in the university, where such research is carried out, are therefore partly to blame for the sustainability problem. By moving away from a richer information environment located within the university and its academic centers and knowledge traditions, and toward a poorer information environment of the technical institution constituted by market-based accrediting agencies and state rules, they lost objectivity and the capacity to evaluate human costs rising within the system of education.¹² Motivated by self-interest and rent seeking activity, faculty in schools of education lowered their respective production costs by connecting virtually all of their activities to the technical (maximal) institution, relinquishing intellectual legitimacy to call into question its direction. Research around how schools and school districts were coupling with the wider institution and its network of standardized information *could not* identify the mounting costs in the system. Therefore, much of the research coming out of schools of education in the U.S. merely consisted in taking the pulse of a dying patient. The University of Chicago chose a different path for its storied school of education. They shut it down and farmed out school and university research to the academic disciplines.

The Institutional Lens of Analysis and the Price of Information

On the question of educational sustainability, the case for the institutional framework of analysis may be summarized in two ways. First, let us consider education as a market. This makes sense because education is a market, one where bilateral and multilateral exchanges take place every day between a teacher or professor and students. This view does not commit us to the prosaic business, corporate, commercial, or commodity vision of seeking financial profits within markets, where human beings, as producers or consumers, are too often viewed as mere instruments of utility, disposable or simple 'widgets,' or commodities to be traded, bought or sold. No, we have a wider view of the meaning of 'market' and a conceptually different kind of profit, one that consists of attaining the education good: the development and flourishing of the individual human being, a necessary condition for the sustainability of civil and free communities. Hence the exchanges occurring between teacher and student may be studied as almost any market may be studied: informationally. Unlike many markets, compulsory education (to age 16, in the U.S.) by definition does not always entail a voluntary exchange. However, those exchanges between teacher and students, as with all markets, remain linked in their quality and performance to the price of information.

Let us illustrate with a simple example, the lecture, where a teacher can provide highly efficient direct instruction to 20, 30, 40, 100 or more students (even more on-line, as with, say, Florida's virtual high school). This method of instruction is a lower priced form of information dissemination than is, say, a Socratic or Paideia seminar,¹³ which are formal ways of conducting engaging conversations, where the teacher as mentor is coming alongside and taping directly into the individual student's knowledge, understanding, interests, and intellectual development.

(Let us parenthetically note that the individual student like the individual teacher represents a particular and unique kind of information-set, one that is not easily replicable over many cases and instances of time.) The

¹² For an early, influential call to arms to embrace this trajectory, see Geraldine Clifford and James Guthrie, *Ed School: A Brief for Professional Education* (Chicago: The University of Chicago Press, 1988).

¹³ Consult the Paideia Center for further explication: <http://www.paideia.org/content.php/system/index.htm>.

Socratic seminar is an expensive pedagogical process because of scarcities in resources, including time, mental energy, and scale, and most of all, because the individual student must be engaged and mentored in a particular and very unique and therefore costly way. In order to do this kind of teaching well it requires a smaller scale, because each student represents a distinct and never fully repeatable information set that can only be optimally accessed and developed, in a formal sense, by a professional educator in a certain type of learning context. In important ways this kind of teaching requires a reasonably rich existential relationship between teacher and student.

Almost every educator confronts the problem of scale. She knows that the scale of a mass education system requires a mix of pedagogies and teaching methods, which are used to achieve a successful and productive learning environment. The professional educator is a possessor of the valuable skill the Greeks called *metis*, the skill of practical knows how, craftsmanship, professional aptitude, cunning, and *savoir-faire*. However, a teacher's set of professional choices (remember, the teacher is no longer allowed to make decisions but merely choices) in the use of curriculum, pedagogy, and methods of assessment, are guided and constrained by the price of information. This simply means that the educational exchange itself is influenced by the price of information. Some curriculum, pedagogies, and assessment methods are more expensive than others. A multiple-choice assessment taken on a Scantron (bubble) form is a less expensive way to assess learning than is an essay or a debate, which is less expensive than a role-play or simulation, which is less expensive than constructing small-scale Shakespearean plays, musical performances, or stage-sequenced science experiments involving the ocean or local lake or ecosystem, or traveling to Gettysburg to study the American Civil War, *et cetera*. At each iteration of learning complexity, where more of the real world is brought into the learning environment, the price of information in teaching and assessment ratchets upward, as it is supposed to do in quality learning organizations. Alternatively, in hyper-standardized educational environments, more expensive inputs and assessments give way to less expensive inputs and assessments. The fertile forms of learning, discovery, human interaction, and professional discernment that are the basis of all effective teaching, gives way to less expensive information environments. In general, the information structure under scale is chosen with a view to cost minimization.

This reality points to the fact that genuine education and learning is expensive for a very important reason: the education good is not a simple process of knowledge and skill distribution. A society that understands what human beings *are* and what education *is*—as a complex state of being and becoming—views it as a necessarily expensive investment into its next generation of citizens. That payoff involves the sustainability of free and innovative social, cultural, political, and economic institutions. As a famous example, California had the investment-in-people idea in mind when it created its 'master plan' for the schools and higher education in 1960. California's was an intelligent attempt at the preservation of diverse, quality education within a scaled environment. Indeed, a lot is at stake for a society as well as the professional educator in this information-institution correspondence. The strength of an education system necessarily corresponds with the proper function of that society's other institutions. The principle of correspondence turns on the quality of the daily point of complex dialogical exchange between teacher and student. The exchange is an investment in both individual people and civilization. And the quality of that exchange and investment depends squarely upon the information environment of production (planning, exchange, and assessment).

Here it is of paramount importance to recognize that the price of information is an effect of the rules that guide production within the institution. The rules act as a spigot or faucet and can allow a greater or lesser volume of information in order to improve order and prediction; they also regulate what types of information teachers are instructed to bias, what types to discriminate against. Education policy makers do well to bear in mind that information is a scarce resource, particularly in scaled markets. Scarcity affects its price. If the individual participant, as student or teacher or principal, represents particular information, then it becomes more expensive to attend to that individual participant; production costs must rise in accounting for that individual participant under processes and rules of standardization. The principle of scarcity demands as much. The reality of the education market represented by the schools, like any market, is governed by rules. And it is the nature and quality of those rules of production that affect the information environment and bias the planning, exchange, and assessment conditions between teachers and students.

In the standardized (or maximal) institution the technical model of production minimizes the value of the individual teacher and student, and the particular information they represent. Teachers and students become interchangeable units of production. Reductionism of the individual to a collective is both local and runs across the breadth of the institution. It may not always be an intentional reduction, where a person is treated as a number. Yet one may logically appreciate the rationality behind engaging the individual participant on these reductionist terms. By denying scarcity—denying all of the particular information the individual teacher and student bring to the exchange—costs lower within the institution (and the individual organization abiding the institution's rules) even though costs rise on the information-set represented by that individual teacher and student. In other words, it becomes more costly for that information originating from individual teacher and student preferences, convictions, experiences, talents, desires, and knowledge-bases to enter into production because there is an information (rule) bias against it. Only lower cost, common, easily repeatable and quickly assessable kind's information can factor into production. Imagine a 'Jiffy Lube' operation done to automobiles, where each oil and fluid change could be performed so efficiently over many cases as to become near a mindless operation, and you will get the picture.¹⁴ One of the author's recalls a teacher education meeting where several of its faculty seemed to agree that the Jiffy Lube production and synthetic evaluation system could be used for teacher training. Perhaps for teacher *training* such reductionism could be used, said the author, but not for teacher *education*, and certainly not in a liberal arts context. The analogy was a poor one to have invoked because education's participants are somewhat more complex than changing the fluids of machines or even the more intricate work of a certified mechanic. Each human being is accorded profound value and dignity by the civilized society for very good reasons, not least is that s/he is not merely a material object being acted upon.

Denying the individual teacher or student's scarcity value (individuality and all that that entails) helps to make the exchanges more efficient (initially lower in cost) because they have become impersonal and can be applied to many cases. The teacher's individual talent or effectiveness, that is, the price of his or her labor within the school, has been controlled and neutralized when denying the scarcity value of that talent in the wider labor market. Standardization of the teacher is an effect of the division of information mentioned above.¹⁵

Teachers come to be viewed by certain administrators as centers of cost not centers of profit or capital assets within the school (Drucker 1999). Every teacher is regarded as good as or the same as every other teacher because production inputs, like the teacher-proof textbook curricula of Open Court (for elementary school reading activities), have aligned with predetermined, readily assessable production outcomes: the test.

¹⁴ For our international audience, Jiffy Lube is an automobile-care company, whose 2,200 franchised operations dot the American landscape. It is certainly the case that each automobile receives (or should receive) parts designed for it and not some other automobile. In that sense, a minute amount of particular information is retained in production. But it is the near mindless uniformity of the process (the means), which comes to presuppose that all of the necessary and sufficient production conditions have been accounted for. It may be so in the fluid changes of a car. Yet the automobile is a different ontological substance than a human being, where some of the necessary conditions for learning are identifiable but there are no sufficient ones.

¹⁵ "The Division of Information is the act of trading off particular information for universal information. It is a dynamical process traceable through institutional rules, regulations, customs, values, ideas, language, symbols, et cetera. It is the cumulative experience of millions of interacting individuals who make production and consumption decisions under conditions of uncertainty regarding future scarcities. In other words, the division of information is an aggregative consequence of individual choice orderings under expansion, the countless decisions to trade-off some preferred values and ends for other preferred values and ends. With cost (in money or other terms) as a guide, the tradeoffs decided upon induce change in the provision of rules and maximizing opportunities, the direction of learning and trials, the discourse and logic—all the existing formal and informal constraints of the institution. Indeed what is going on inside all of this activity, at a level much harder to observe, is the perpetual yielding of higher cost (particular) information to lower cost (universal) information. In terms of increasing scale, the same pattern of trading off one kind of information for another applies to complexity in all institutional settings; it persists in the face of various disturbances and continues through time on its low cost (universal) trajectory. [The] division of information [is] the specific mechanism by which institutional expansion gets priced below its social cost; it is the article upon which liberty stands or falls." Rodriguez, Loomis, and Weeres, p. 3.

The alignment of inputs to outputs eliminates and controls production variation. As a result, in many American high schools, teachers who teach in areas outside of the controlled areas of curriculum (e.g., in electives such as art, music, physical education, vocational education, and psychology) are either eliminated, decreased, or pushed into a controlled area or regimented program such as an Advanced Placement program. The lower cost measure of the output (a standardized test or curriculum or both) depletes the variation of curricular options thereby neutralizing a teacher's talent and effectiveness in an area of study that does not comport with the core curriculum, thus further attenuating his or her scarcity-value to the learning organization. Put simply, those teachers become expendable.

Couple the lower cost outcome measure of the student test score and minimized teacher autonomy to a teacher evaluation performance measure, which are currently taking the form of 'value-added' measures solely calculated from student test score growth, and accountability rationales begin to develop around viciously positivist and illiberal assumptions. Epistemological problems of knowledge and of cause and effect begin to quickly surface. Again, the value-added approach while done with rigor (Sanders, Saxton, & Horn, 1997) provides yet another attenuated definition of teacher effectiveness captured under the most cost effective conditions. Moreover, in the case of the Tennessee Value-Added Assessment System (TVASS), the model "represents teacher effects as independent, additive, and linear" (Kupermintz, 2003: 260). This represents an education condition where the teacher is seen as being the direct and only effect on a passive recipient (student), leading to a fallacy of causation: teacher as final cause instead of teacher as instrumental cause for learning. The model makes no account for a student's participation—his or her casual agency and brain development—in the learning process or the host of environmental factors (e.g., parental involvement, socio-economic status, school climate, community resources) that might also mediate or mitigate this effect.

A similar movement is afoot in higher education with the standardization of the professoriate. Cost appears to be the central driver. The logic is to deny the largest cost in the system: the scarcity value of the individual professor and his or her unique labor talent. The move works to transfer the means of production away from the individual teacher or professor and toward the organization, and ultimately to the maximal institution. It is a way to depersonalize the processes of education. The increasing use of tenureless adjunct professors in universities is one effect. Financial costs lower initially, while long-term social costs increase exponentially in what and who does not develop and flourish, what social institutions fail to achieve their respective goods. Over time, what ensues is a remarkable underproduction of human and social capital from which a society finds difficult to recover. At some tipping point, counter-production exceeds production; what doesn't occur in formal schooling becomes more valuable than what does occur.

The Strategic Question for a Society's Institution of Education

During the later half of the twentieth century in the U.S., influence over those rules of production shifted from local districts to state boards of education and, now, to the federal government. Looking forward, the rules presently supporting the national market of education in the U.S. and elsewhere are themselves changing because the national market is gradually giving way to the formation of regional and global (transnational, supranational) markets triggered by international testing comparisons, global competition, and theories of accreditation and human capital development. This is evidenced in the enthusiastic focus given to the Trends in International Mathematics and Science Study (TIMSS), which, in 2011, was given in more than 60 countries including the United States. More than 20,000 students nationally and 500,000 students internationally participated in this assessment. These data will inform U.S. national policy as it looks to mark how comparisons in the future are likely to compete in the world economy. In 2011, the U.S. National Center for Education Statistics linked the scores of the National Assessment of Education Progress (NAEP) to TIMSS providing all U.S. states with a comparison of their students' performance against international benchmarks.

What is likely to happen is that the NAEP-TIMSS link-up will work like a bond rating agency that not only signals climate conditions for business investment, but will impose costs on entities and cultures that do not comport with the rationalized schooling output expectations.¹⁶

¹⁶ Bond rating agencies price risk in financial markets, which lead to the ability of corporations, municipalities, and even nation-states to borrow money at prescribed interest rates. This process determines the borrowing entity's credit worthiness and defines the policy limits of that entity's actions. Moody's, Pimco, Standard and Poor's, Fitch, and China's Dagong are

Higher test scores will come to embody further reductionistic views of participants as mere labor talent, imposing stark costs against lower performing states and countries. The lower performing will be encouraged to adopt standardized production processes so as to ‘catch up’ to higher performing nation-states. Effectively, it is the same prescription of the *A Nation at Risk* report, only repeated at the global level. Another example of it serves to impress this point. The Organisation for Economic Co-operation and Development’s (OECD) Programme for International Student Assessment (PISA) seeks to facilitate this ‘catch up’ process (2010):

The OECD’s PISA aims to help countries see how their school systems match up globally with regard to their quality, equity and efficiency. The best performing education systems show what others can aspire to, as well as inspire national efforts to help students to learn better, teachers to teach better, and school systems to become more effective.

In 2011, as part of the deliverables of the OECD’s 50th Anniversary, the organisation will launch two new programmes to help countries build, maintain and improve the skills of their citizens for tomorrow’s world. The first results of the Programme for the International Assessment of Adult Competencies (PIAAC) and the OECD Skills Strategy will be released in 2013.

This international trend means that the rules supporting the national market of education will themselves be called into question and change as the market moves gradually outside the box of a national (sovereign) rule system, as occurred in the shift from local to national control. Across the productive activities of the schools, and to a lesser extent higher education, the institutional shift will release forces similar to those affecting other sectors of the economy: manufacturing on demand, lean production, outsourcing, and production chains that extend globally, flattened hierarchies, and the end of bureaucracy. It is the rise of maximal institutionalism within organizations that is bringing about the demise of bureaucracy. The bureaucracy championed by sociologist Max Weber was never perfect but it was a preserver of particular information. It was based on a social contract. The division of information, which is occurring under expansion and the new constitutive rules, is now abridging those social contract relationships. The division of information is altering not just the nature of education, moving it from information states of complexity to information states of simplicity, it is also distorting the idea of freedom (e.g., a purely collective emphasis), and it is changing the very meaning of democracy, from an active citizenry to mere collective assent to the rules. For example, consider the idea of global retailer ‘Wal-Mart’ being applied to learning organizations; the organization learns to govern through depersonalized constitutive rules, not individual people, or through relationships, or in the presence of obligation, virtue, and reciprocity; in a word, through civility. Rather, social valuation changes under maximal institutionalism. It is a change emphasizing artificial utility scales. And the shift in institutional form only accentuates the pitfalls and costs building within the education system that are already in place; namely, it is imposing a cost on the individual’s access to knowledge and skills.

The Policy Question: Institutional Design

In order to accurately assess the effects that the shift will have on the sustainability of education within nation-states, policy makers will require the capacity to ground research in institutional analysis. A key problem for different cultures and nations will be to figure out how to optimize (as opposed to maximize) the production of education given the constraints of growth and information cost. This problem may be especially acute during economic recessions and depressions, as may be witnessed in places as culturally diverse as Ireland, Greece, Japan, Portugal, Spain, France, and the U.S., not to mention economic developing countries.

The problem many societies will confront will be to identify what particular information, lodged in the individual human being and local culture, needs to be retained or put back into production within the school or university given the information loss that occurs under maximal institutionalism and its technical model of production.

leading examples of bond rating agencies that can dramatically affect public entities like municipal or sovereign national governments, as for example the EU countries Greece, Spain, Portugal, and Ireland, requiring them to attend to large debt-to-GDP ratios. They do this by creating an obligation beyond consent.

The answer to these issues will vary from culture to culture and from one national circumstance to another. There is no handy formula or sociological algorithm to follow. And ideologies such as Marxism or Critical Theory cannot adequately answer such questions.¹⁷ Yet, in many ways, the question of institutional design can become a central focus of education researchers, leaders, and policy makers during the development of new multi-state regional and global education markets.

Indeed, the United Kingdom has been reevaluating its information imbalance, with the Tory-led coalition government attempting to loosen its rule regime. Regrettably, the UK appears to be falling into the same logical trap that the American *A Nation at Risk* reformers fell into, that is, seeking organizational freedom within government and market sectors, while at the same time maintaining the pre-existing standardized rule environment.¹⁸ This is akin to trying to inject particular information through a production screen that accepts only universal information. A mismatch results within public policy, with the maximal rule environment winning the contest.

What would be required to preserve quality education is for more countries to ignore or opt out of the international comparisons, break up many of the national and international rules across public and private sectors, and ensure that the patchwork of accrediting agencies operate on principles that will avoid the division of information mechanism. This is the 'let a thousand flowers bloom' path. It addresses the problems of information and knowledge identified by economist Friedrich Hayek (1945), without embracing his faulty assumptions regarding the inherent neutrality or costlessness of rules. One model of decentralization that might be studied is New Zealand's efforts during the 1990s. No matter which country is studied, the research strategy would provide the ability for practitioners (teachers and leaders) to see how and under what circumstances their own organization connects with the wider institution of education, and how and where the information loss is occurring. To our knowledge, this capacity does not presently exist anywhere within educational research. A school of education nearly anywhere in the world could capture the field of educational research using institutional analysis and design.

Consequently, the information tradeoff under a technical model of production should be viewed strategically. What particular information would help to improve production? The application of universal information improves efficiency along a narrower path, a smaller bandwidth. The loss of particular information affects the quality of production. A mix of universal and particular information is needed for the production of quality education. How can the rules be fashioned to optimize workable equilibria between particular and universal information? Therefore, the institutional perspective allows the researcher, leader, or policy maker to see the importance of both types of information. The organizational framework (e.g., Meyer and Rowan 1977) focuses mainly on conformity of the organization (the school or school district or university) to the superintending rules of the institution, not the impairment of production that occurs as a result of the loss of particular information. From the commanding heights, decisions about particular information are the more difficult to figure out because, as we have demonstrated, that type of information is inherently more expensive to consider, preserve, and to (re)introduce into production. It is largely an individual and local matter.

Sorting the production issue out is where the competitive advantage for a nation-state often lies. Sorting this issue out is an opportunity for a new direction of basic and applied research. These will be the kinds of issues that are arising under globalization.

¹⁷ We will address why this is so on another occasion. We will say here that certain strains of Marxist thought and Critical Theory have the potential to be powerful allies in the critique of maximal institutionalism.

¹⁸ Consider this headline from The Guardian on October 26, 2010: "Freedom for schools won't make the money go any further: The government wants schools to be more independent and teaching priorities to change, but how does that sit with the financial [economic] stringency it is also imposing?" <http://www.guardian.co.uk/education/2010/oct/26/estelle-morris-schools-freedom-cuts> on October 27, 2010. The Economist reports precisely what the challenge is: "The rhetoric of the announcements this week about the future of local government was uplifting. Eric Pickles, the Conservative communities and local government secretary, said on December 13th that reforms in a new bill marked 'a ground-breaking shift in power to councils and communities'. But the reality of the funding settlement he announced the same day, specifying how much less councils will get in central money over the next two years, was a bleak reminder of the grip Whitehall retains over local authorities, by providing just over half their finance." The Economist, "Careful What You Wish For," December 18, 2010, pp. 137-138. We do well to look upon the institution of money as a set of rules.

The tradeoff the United States made in joining its states was to homogenize virtually everything under a central authority. What was once the purview of individual states (particular information) before the Civil War and under the 10th Amendment to the U.S. Constitution is now largely regulated by a federal system (universal information). While this was no doubt necessary in certain instances (e.g., civil rights), scholars, leaders, and policy makers cannot afford to ignore real tradeoffs that affect individual or local freedom in the production of a complex good like education. For example, if the European Union (EU) is to succeed it will need to figure out the issues of particular information vested among its twenty-seven member countries. So will almost all the smaller countries and communities in the new global and transnational market. They will confront a similar competitive problem (postwar) Toyota faced: how to capture competitive advantage in an automobile market where competitors like General Motors possess greater (universal) resources. The fact that educational systems around the world are moving toward a condition of fewer qualitative distinctions makes this line of research and policy making particularly important.

As the education market transitions from a national to a global environment, the policy problem now facing a nation-state is how to achieve competitive differentiation within an increasingly uniform market. Success on these terms will depend on finding some particular advantage that could be clarified to find a qualitative and competitive edge, something that will sustain that country's identity and social institutions. The particular attributes might involve an intimate understanding of a terrain of knowledge, or experience of institutional climate, or preserving cultural particularities, or the complexities of the single and non-repeatable situation, the recruitment, development, and retention of a brilliant line of dedicated faculty, but is always understood as being connected to the individual and local circumstance in some complex and dynamic relation to the universal. Failure to operate with strategic vision will bear costs, eventually, for organizations, institutions, and societies and over time stunt their progress. It will bear costs too for individuals within those societies.

Finally, consider briefly one further historical example. Joseph Needham, in his exhaustive study of China's scientific discoveries (*Science and Civilization*, Volumes 1-20), poses an interesting question or challenge that should give scholars and policy makers pause. Needham's Challenge, as it is called, illustrates potential devastating results for a society and its progress when the activation of the division of information mechanism works against national interests. After studying the culture of China, and the remarkable amount of scientific discovery the Chinese people were able to produce (e.g., gunpowder, paper, the printing press), much of it earlier than in the West, he questions why the Chinese did not originate an industrial revolution. As one plausible answer, Needham considered that the standardization of entrance exams into government civil service jobs so affected educational incentives and curriculum that it may have stifled the intellectual attributes of creativity, divergent and innovative thinking. In order to achieve economic success, many people with innovative minds married their energies with achieving top scores on narrow entrance examinations. They responded rationally to the economic incentives set before them, at the same time likely stunting the unique intellectual conditions within China that contributed to divergent thinking, novelty and originality, necessary for revolutionary invention, progress and change. Needham's question and plausible answers, if correct, are a warning for developed and developing countries to attend to institutional design.¹⁹ The China of today seems perfectly aware of its deficits and feels some urgency of perception to repair them. Stack (2011:2) cites this comment from education professor Xiong Bingqi, of Shanghai's Jiao Tong University: "In the long run, for [China] to become a strong country, we need talent and great creativity... And right now, our educational system cannot accomplish this."

Conclusion

It is the identification and preservation of particular information—the recognition of its importance, the vision for how it could be utilized to keep at bay excessive standardization—that makes the quality aspects of education potentially sustainable. The key to success for a people is figuring out “who we are” as a culture and society, and “what should our social institutions value.”

¹⁹ Steven Johnson's book, *Where Good Ideas Come From: The Natural History of Innovation* (2010), is another poignant example of the potential tradeoffs for not properly attending to institutional design.

That is how the tradeoff of information under internationalization becomes a strategic policy question. Harold T. Shapiro (2005: 113), former president of Princeton University, notes in his book *A Larger Sense of Purpose*, “the most valuable part of education for any learned profession is that aspect that teaches future professionals to think, read, compare, discriminate, analyze, form judgments, and generally enhance their capacity to confront the ambiguities and enigmas of the human condition.” To do so requires a mix of particular and universal information.

Our thesis has been that, within a technical or maximal institution, universal information displaces particular information and that this information loss impairs production of the education good; it prevents Shapiro’s larger sense of purpose. If this thesis is correct, then the strategic policy question which surfaces for a nation-state and its education system is what kind of particular information needs to be preserved or reintroduced into production to give a community or country or a people a comparative advantage in competition under conditions of scarcity. Figuring this out is no easy task. Solutions will look different over different time horizons and cultural contexts. All of the particular information that is being displaced cannot be put back without becoming too expensive (the corollary to the loss thesis). Leaving it all out impairs the production of quality education. So the policy question is, what should be kept or reintroduced in order to optimize learning opportunities for individuals and societies? This is a Nash equilibrium question. For many countries and communities that is the big policy question they are confronting in the larger (global) education market.

They will need to tap into some aspect of themselves as a people—their religions, history, culture, their philosophic traditions, their values, the spirit of creativity and innovation—something specific or particular to their own experience as a people. Trying to standardize information is not much help. That was tried in the U.S. by lowering class size (e.g., in California during the 1990s), in the belief that more particular information would enter education processes, or making schools themselves smaller (e.g., the Bill and Melinda Gates Foundation recommendations). But this is simply another way of thinking about education as universal information. It is another attempt to identify a universal production function, as the economists call it. The attempt does not really address the problem of particular information; it looks for a prescription that does adequately not address the illness. Yet the triumph of a high quality education system does not depend just on material resources (universal information), but on the intangibles of particular information—that willingness to struggle, that urgency of perception, that commitment to figuring out how to succeed, that individual, family, and community commitment to the primary and secondary goods of civilization.

As U.S. social, cultural, political, and economic institutions transition to and integrate with global markets of information; the quality of its own system of education will become increasingly important, especially if American economic power recedes, a highly plausible scenario. It seems to us that, for the U.S., as for many countries, this is a national security question. Countries or parts of countries, such as within regional education districts that have attempted to work out an information equilibrium suggested, for example, by the McKinsey Report (2010), recognize that a system of education which accounts for the information conditions for human-scale environments is an essential aspect for endeavors to improve society. Institutional design is the proper analysis and epistemology to achieve vigorous forms of sustainability.²⁰

References

- Arrow, Kenneth. (2nd ed. 1963). *Social Choice and Individual Values*. New York: Wiley.
- Barrow, Lisa and Rouse, Cicilia Elena. (2005). “Causality, Causality, Causality: The View of Education Inputs and Outputs from Economics,” a paper prepared for the Consortium for Policy Research in Education, State of Education Policy Research Meeting, February 14-15, Federal Reserve Bank of Chicago.
- Bowles, Samuel. (2004). *Microeconomics: Behavior, Institutions, and Evolution*. Princeton, N.J.: Princeton University Press.

²⁰ Authors wish to thank their respective organizations for support assistance during 2010-11, the period in which this research and writing was carried out, including two sabbatical projects. Dr. Loomis wishes to acknowledge his brother, David, for supervising the editing and publication of this article.

- Boyd, William. (2004). "Are Education and Efficiency Antithetical? Education for Democracy vs the 'Cult of Efficiency'" *Journal of Educational Administration*. Vol. 42, No. 2, 160-173.
- Callahan, Raymond. (1962). *Education and the Cult of Efficiency*. Chicago: University of Chicago Press.
- Clifford, Geraldine and Guthrie, James. (1988). *Ed School: A Brief for Professional Education*. Chicago: The University of Chicago Press.
- Drucker, Peter. (1999). *Management Challenges for the 21st Century*. New York: Harper Business.
- Duncan, Arne. (2010). "Back to School: Enhancing U.S. Education and Competitiveness." *Foreign Affairs*. Vol. 89, No. 6, 65-74.
- Economist, The. (2010). "Careful What You Wish For." December 18. 137-138.
- Hayek, Friedrich. (1945). "The Use of Knowledge in Society." *The American Economic Review*. Vol. 35, No. 4 (September), 519-530.
- Ingersoll, Richard (2003). *Who Controls Teachers' Work?: Power and Accountability in America's Schools*. Cambridge, MA: Harvard University Press.
- Jacob, Brian. (2005). "Accountability Incentives and Behavior: The Impact of High Stakes Testing in the Chicago Public Schools." *Journal of Public Economics*. Vol. 89, No. 5, 761-796.
- Jacob, Brian and Levitt, Steven. (2003). "Rotten Apples: An Investigation of the Prevalence and Predictors of Teacher Cheating." *Quarterly Journal of Economics*. Vol. 118, No. 3, 843-877.
- Johnson, Steven (2010). *Where Good Ideas Come From: The Natural History of Innovation*. New York: Riverhead Books (Penguin Books).
- Klein, Stephen, Hamilton, Laura, McCaffrey, Daniel, and Stecher, Brian. (2000). "What Do Test Scores in Texas Tell Us?" *RAND Issue Paper 202*.
- Koretz, Daniel M. (2002). "Limitations in the Use of Achievement Tests as Measures of Educators' Productivity." *Journal of Human Resources*. Vol. 37, No. 4, 752-777.
- Kupermintz, H. (2003) Teacher Effects and Teacher Effectiveness: A Validity Investigation of the Tennessee Value Added Assessment System. *Educational Evaluation and Policy Analysis*. Fall, Vol. 25, No. 3, 287-298.
- McKinsey and Company. (2010). "How the World's Most Improved School Systems Keep Getting Better." London.
- Meyer, John and Rowan, Brian. (1977). "Institutionalized Organizations: Formal Structure as Myth and Ceremony." *American Journal of Sociology*. Vol. 83, No. 2, 340-63.
- Nash, John. (1950). "Equilibrium Points in n-Person Games." *Proceedings of the National Academy of Sciences of the United States of America*. Vo. 36, No. 1, 48-49.
- Needham, Joseph. (1956 and forward). *Science and Civilisation in China: Volumes 1-20*. Cambridge: Cambridge University Press.
- Nelson, Richard. (2005). *Technology, Institutions, and Economic Growth*. Cambridge, MA: Harvard University Press.
- North, Douglass. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.
- Programme for International Student Assessment (2010). Organisation for Economic Co-operation and Development: http://www.oecd.org/document/12/0,3746,en_2649_201185_46623628_1_1_1_1,00.html(accessed on December 10, 2010).
- Rawls, John. (1955). "Two Concepts of Rules." *The Philosophical Review*. Vol. 64, 3-32.
- Rodriguez, Jacob P., Loomis, Steven R., and Weeres, Joseph G. (2007). *The Cost of Institutions: Information and Freedom Expanding Economies*. New York: Palgrave Macmillan.
- Sanders, W.L., Saxton, A.M., & Horn, S.P. (1997). The Tennessee value-added system: A quantitative outcomes-based approach to educational assessment. In J. Millman (Ed.), *Grading teachers, grading schools: Is student achievement a valid measure?* Thousand Oaks, CA: Corwin Press, Inc. (137-162).
- Sen, Amartya. (2011). *The Idea of Justice*. Cambridge, MA: Belknap Press of Harvard University.
- Shapiro, Harold T. (2005). *A Larger Sense of Purpose: Higher Education and Society*. Princeton, NJ: Princeton University Press.
- Stack, Megan. (2011). "Chinese students' high scores in international tests come at a cost." *Los Angeles Times*. <http://www.latimes.com/news/nationworld/world/la-fg-china-education-20110113,0,6192691.story>(.)
- Taylor, Fredrick. (1911). *Principles of Scientific Management*. New York: Harper.
- The National Commission on Excellence in Education. (1983). "A Nation at Risk: The Imperative for Educational Reform." A Report to the Nation and the Secretary of Education United States Department of Education. Washington, D.C.