

Chapter 1

Education in the information age: scenarios, equity and equality

by
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Jay Ogilvy addresses here the application of scenario planning to the future of education. He first reflects on methods and the different uses of scenarios, comparing features of education and business. He then illustrates the methodological points. He shows how parallels can be drawn between the challenges facing school decision-making and those of “precision farming”, using sophisticated personalised approaches. Jay Ogilvy calls for a much more sustained realisation of equity and equality as essential in the Information Age when access to knowledge is fundamental. And, he argues for applying market principles as opposed to the excessive bureaucracy that can stifle educational innovation.

Implementing scenario planning

The teams working with the OECD “Schooling for Tomorrow” project from different countries are enthusiastic about the use of scenarios in general, and grateful for the hard work, solid research, and creative insight that informed the OECD/CERI scenarios. But each found it necessary to customise the scenarios in some way in order to get buy in from their own local constituencies. This is a common problem. At Global Business

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Network (GBN) we have a saying: “Scenarios are a little like sex – talking about other people’s is never as interesting as your own.”

In propagating the use of scenarios we face a dilemma: if you supply ready-made scenarios, buy-in and ownership can pose a problem. But if you expect each nation, each district, each school site to create its own customised scenarios, you may lack the resources to provide skilled facilitation, research, and the time necessary to do the job right. There is a way through this dilemma. Very briefly, the solution is to provide a scenario “starter kit” as part of a “toolbox”; the question then is just how much or how little to put in it. To answer this question, it helps to look at three different uses of scenarios: to provoke strategic conversation; to stimulate genuinely new, visionary thinking; and as a motivator for getting unstuck.

Scenarios as tools to provoke strategic conversation

One of the main benefits of scenarios is their capacity to engage participants in a process of civil conversation about the future of education. A set of alternative scenarios provides a very broad tent under which people with widely differing, and often passionately held, views can speak with one another about their children’s future. Because scenarios are “just stories”, and not yet plans cast in concrete, they can be entertained and discussed in a realm well short of dedicated commitment. Because scenarios are divergent, because they do not, at first, force convergence on consensus, they allow widely different views go gain a respectful hearing. For this reason, they are good tools for engaging an entire community, or an entire nation. Scenario planning is a safe game for consenting adults where you do not get blood on the walls.

This positive feature of scenario planning has its downside for educators, however. Where business people tend to be action oriented, educators tend to be talk oriented. When conducting scenario planning in a business context, it is often difficult to get entrepreneurial managers to have the patience needed to develop a set of scenarios about different possible environments without leaping ahead toward actions to be taken this coming Monday. Business people do not want to talk about what their world may do to them; they want to talk about what they can do to their world. They do not want to take the kind of “outside-in” perspective characteristic of scenario planning; they want to take the kind of “inside-out” perspective – the activist perspective characteristic of entrepreneurs.

Having worked both sides of the street – in education policy and in business – I suggest that scenario planners in education need to be cognisant of these tendencies. It is important to be aware of educators’ preference for talk over action. Faced with strategic choices, educators are inclined to ask

for further research and more deliberation where business people will opt for immediate action. As business consultant, Tom Peters, has put it: “Ready, fire, aim!” Educators want to aim, and aim carefully, before they fire. They want to think first – for good reason – and act later, sometimes so much later that action never quite happens.

Scenario planners in education need thus to make sure that the scenarios do not become pretexts for endless conversations. They need to make sure that the scenarios *get used to make decisions*. To that end, they need to make sure that those who are capable of making and implementing decisions take ownership of whatever ready-made scenarios are placed in front of them. And for that purpose, one of the best methods is to engage participants in a participatory exercise that *uses and enhances* the scenarios without necessarily disassembling and reassembling them.

In GBN experience, one of the best such exercises is the development of lists of *early indicators*. This exercise has a dual function: first, the process of brainstorming early indicators for each scenario requires an immersion in the content and logic of each scenario. As people try to imagine the first signs of a given scenario, they inevitably find themselves imaginatively occupying the world described by that scenario. Once so engaged, and once they find themselves contributing early indicators, they are more likely to take ownership of the scenarios. Where this first function may be a covert result of the *process* of engagement, the second function is providing the overt product – the lists of early indicators. As the second half of this paper will argue in greater detail, early indicators – of scenarios, and of the success or failure of schools or individual students – are much more to be desired than trailing indicators when remediation is inevitably too late.

So to summarise this first methodological point about the uses of scenarios: the good news – their divergence allows different views a respectful hearing; the bad news – educators may listen and talk for ever without acting. So make sure that people *engage* with the scenarios and use them to make and implement decisions. And to that end, engage them in the process of developing lists of early indicators.

Scenarios can stimulate new, visionary thinking

Just as we tend to parent the way we were parented, so we tend to educate the way we were educated. It is not easy to imagine genuinely new ways to do something so utterly familiar to all of us. So fundamental a feature of the human experience is about as subject to innovation as eating or sleeping. But we *have* changed our eating habits. Improved nutrition has extended life expectancy. Surely we should be able to imagine better ways to educate.

Part of the challenge lies not only in the inertia of fixed habits but in the systematic interconnections among the many parts of our educational systems. As systems theorists are wont to say, *you can't change just one thing*. Try to change one aspect of the curriculum – e.g., class size – and you upset other parts of the system. In California, Governor Pete Wilson surprised both the citizens and the teachers' union with a reduced class size initiative. What a wonderful idea! We all knew that young children were not getting enough individualised attention in large classes. But what seemed like a good idea at the time had not been thought through. Had there been detailed scenarios, the Governor might have seen the consequences of the consequences, namely, that smaller classes would require more teachers and more classrooms. As it happened, the initiative resulted in a sharp increase in the number of inner-city children learning in makeshift trailers from hastily recruited and non-credentialed “teachers”. What seemed like a good idea at the time ran the danger of increasing, not decreasing, the inequality between poor inner-city schools and rich suburban schools.

Scenarios, just because they are whole stories and not analytic theories, can provide a format for entertaining systemic change. Well short of pie-in-the-sky utopian thinking, positive scenarios can depict the interactions among the many, many parts of the education *system*: teachers, students, buildings, parents, the local community, new technology, the school-to-work transition, economics, etc. There is no single silver bullet for educational reform, and no one reform is likely to survive unless it is connected up with other parts of a *new* system that will support it. Change just one thing, and the rest of the system will pull that reform back into the old equilibrium, as many reformers have discovered. But in order to change everything at once, you need the kind of holistic, comprehensive vision that a positive scenario can provide.

Because systemic reform is so challenging, positive scenarios are intellectually very difficult to craft. Negative scenarios are much easier – you just describe the demise of what you already know. But positive scenarios must paint something new, a reality as yet unseen. For this reason, positive scenarios run the risk of rejection for being too optimistic, too utopian. Just as it is difficult to anticipate technological breakthroughs – who knew they needed a Xerox machine before it was invented – so it is difficult to anticipate what a better school would look like. But unless we are prepared to believe that the schools we have are the best we *could* have, we have to believe that the breakthroughs are out there, just beyond the horizon of habit and familiarity. And scenarios are the tools for stimulating us to imagine those holistic, comprehensive, systemic reforms that go beyond silver bullet solutions.

In keeping with the methodological hint about using early indicators to engage audiences in scenarios they did not invent themselves, here is a hard won hint for shaping positive scenarios in a way that will enhance their acceptability: let them be short, not long; sketchy, not detailed. In his book, Stephen Denning (2000) advocates what he calls a “minimalist” style of story-telling – brief vignettes that purposely leave a lot to the listener’s own imagination. Precisely by leaving a lot of space for the reader or listener to fill in for him or herself, minimalist stories enhance the likelihood that they will take ownership of a story to which they have contributed.

Minimalist storytelling also manages a marriage of convenience with the main challenge of positive scenarios: smarter minds than ours have tried to invent a better education, and they have not succeeded yet. This is a *hard* problem. If we had solved it already, we would already be in that more positive scenario. The fact that we *need* school reform is itself evidence that we lack the solutions we need to give a detailed description to a more positive scenario. So for that reason as well, best to leave the positive scenarios somewhat sketchy. Paint the allure, but leave a veil of unknowing. Precisely in order to seduce, do not try to show it all.

Scenarios as a motivator for getting unstuck

The methodological advice is precisely opposite in the case of negative scenarios. Muster all the production values at your disposal to paint worst case scenarios that are so ugly they function like morality plays: the movie, *The Day After Tomorrow*, does not claim to be great science but the special effects people in Hollywood and their portrait of New York under ice may have done more to stimulate broad concern about carbon-dioxide and rapid climate change than any number of scholarly discourses on the subject. Doom-and-gloom scenarios are psychologically difficult. We do not like worst case scenarios, even in our imagination. But, again, they are intellectually easy to draw. You do not have to invent a *better* way; you just have to destroy the existing way. By rehearsing the disaster in imagination, you may avoid it in reality. Negative scenarios drawn in all their gory detail can deliver a kind of *anticipatory disaster relief*. They can motivate the lethargic masses by putting the fear of God – or the hell of the worst case scenario – into them.

It is not hard to imagine bad scenarios for education. In *Savage Inequalities*, Jonathan Kozol describes schools so decrepit and classrooms so hopeless it is frightening. The second part of this chapter is therefore devoted to the issue of educational inequality, and what it might take to reduce it. While not cast in the form of a scenario – it is not a story with a beginning, middle, and an end – it nonetheless illustrates some of the

methodological points I have just made. Though far short of a systemic solution to educational reform, it provides a minimal sketch for improvement by way of an extended analogy between what I call “precision schooling”, and the already existing practice of precision farming. It is just a sketch, but it highlights the importance of early indicators, and the promise of new information technologies.

A declaration of educational equality

Over two centuries ago, America’s *Declaration of Independence* stated, “All men are created equal”. Women, unfortunately, had to wait over a century before they received the vote, and some women are waiting still for full respect of their humanity. And people of colour continue to fight racism and the legacies of disadvantage. Over a century ago the United States fought its only civil war to put an end to slavery. During the 1960s the civil rights movement, led by the likes of Martin Luther King Jr., sacrificed more lives to bring an end to segregation in our schools. The idea of “separate but equal” education did not deliver on the promise of equal rights to “life, liberty, and the pursuit of happiness”.

The noble quest to honour the dignity of *all* citizens is being tested once again. For many reasons – from the invention of the automobile and the advent of the suburbs to the information revolution and the globalisation of the job market – we now find ourselves in a situation where people of colour are not receiving the equal rights granted to them under the laws of most OECD countries. Nor are the poor in developing nations around the globe receiving the kind of schooling that would help lift them out of poverty.

Call the problem the crisis of urban education in the advanced nations, or – following Manuel Castells’s (1998, in particular Chapter 2) description of pockets of poverty in both advanced and developing worlds in the new, globalised information economy – call it the crisis of the “black holes of informational capitalism”. In fact it is most sorely felt as a crisis for people of colour. During the last half of the 20th century, white flight from the centres of many major cities left minorities in old and run down schools while many of the mostly white children attended newer and better staffed schools in the suburban cities. In principle, the U.S. ended segregation with the Civil Rights Act of 1964 and Supreme Court decisions like *Brown vs. the Board of Education*. But *de facto*, segregation is still with us. The facts are overwhelming and irrefutable. When you compare the educational performance of inner city children with suburban children, you find an intolerable gap in achievement.

This gap is morally intolerable. We are all the worse if some of us are denied the tools they need to pursue life, liberty and happiness. This gap is also economically intolerable. The benefits of the information revolution and the knowledge economy extend mainly to those who have the knowledge to use information to their own and others' benefit. In the information age, in what some call the knowledge economy, we are all worse off if some of us cannot read or write. We are all worse off if some of us cannot solve the simple tasks of reading a bus schedule or writing a cheque. We are all worse off if some of us cannot cope with more complex tasks like filling out the forms to manage our own health or the health of our families. Educational inequity is everybody's problem. We all have much to gain – or much to lose – depending on how well we address what Jonathan Kozol calls *Savage Inequalities*. You cannot blame parents, black or white, for moving to the suburbs to find better schools for their children. And you cannot blame minorities for poor academic achievement in schools that their classmates abandoned for good reason. But you can and should expect the citizens of the OECD nations to tackle a problem which, left unsolved, will hurt all of us.

We must come to grips with educational inequity – boldly, intelligently, and with the courage of our convictions. Almost 40 years ago President Lyndon Johnson declared a “War on Poverty”. Institutions like the World Bank, the IMF and the OECD have been fighting this war around the world. We have not won this war, in part because we mistook the real enemy. In a knowledge economy, the only way you can win the war on poverty is to wage war on ignorance. We can finally win the war on poverty if, first, we win the war on ignorance. But in order to win the war on ignorance, we need to address the black holes of informational capitalism in developing nations and in the urban ghettos of OECD countries.

How will we go about solving the problems of educational inequity and *de facto* segregation? And what should the role of federal governments be in providing a solution? The first step consists in recognising the seriousness of the problem. The second consists in gaining clarity about its origins and causes. Our public schools bear the scars of their birth in the agricultural and industrial eras. Schools get long summer vacations because, when our public school system was first founded, students were expected to spend their summers tending animals and harvesting crops. The industrial revolution also left its marks on our schools. During the first half of the 20th century there was a major change in the way we educated our children. Educators were deeply influenced by the lessons of scientific management that allowed the industrial revolution to lift so many out of poverty. Henry Ford introduced methods of mass manufacturing for the mass market of America's increasing middle class. Where craftsmen in the 19th century

hand-crafted carriages one by one for an elite clientele, Henry Ford invented the assembly line to mass-manufacture identical Model-Ts at a price his workers could afford. The cars were cheap because they were produced by the tens of thousands. Mass manufacturing relied on economies of scale.

Scientific management and the industrial revolution were great achievements that helped to build the economies of the OECD. No wonder our educators wanted to model schools after factories. The scientific progressives of the early 20th century achieved economies of scale in education by creating large schools to replace the one room school houses. Students were seated in rows as rational and orderly as the factory floor. In the name of equity, they were given identical lessons in lock-step sequences modelled on the assembly line (Senge, 2000). Industrial age education worked after a fashion. High school graduation rates increased many-fold in OECD nations between 1900 and 1960.

But that was the industrial era improving on the one room school houses of the agricultural era. Now we are heirs to an information revolution every bit as important as the industrial revolution. But we have not yet updated our schools according to the lessons of the information revolution. Industry now uses the fruits of the information revolution to achieve efficiencies without resorting to economies of scale. Rather than relying on mass markets that want more and more of the same, new methods of manufacturing use computers to customise different products for different customers.

From precision farming to precision schooling

Not just industrialists but farmers as well are using the fruits of the information revolution to improve their yields. In the past ten years, information technology has come to agriculture under the name “precision farming”. Farmers use satellite imagery to spot patterns on their fields, sensors on the ground to test for moisture, and global positioning satellites (GPS) and onboard computers to customise the distribution of seeds, water, herbicides and fertilizers foot by foot as their combines cross their fields.

Some information is gathered at harvest time. Equipped with GPS, a combine can pick and weigh a crop and record the information as it crosses a field. (Think of outcomes, standards, and accountability as analogues.) This information is then used when the field is next tilled, planted, treated and fertilized. Sensors on the ground and satellite imagery also gather information on soil quality and moisture. That information, too, can be factored into the application of seeds, herbicides and fertilizers. By knowing what each square foot of field needs, then using that knowledge to

administer what is wanted, precision farming moves beyond an industrial paradigm.

Today's most advanced equipment carries the fertilizer elements in separate tanks, both to and in the field, and mixes them just before dispersal. To accomplish this, the farmer must mount a GPS receiver on the fertilizer truck so that the equipment knows its location in the field. An in-vehicle computer must contain the fertilizer-needs maps, which it compares to the field position data arriving from the GPS receiver. It also controls the distribution valves and gates to provide an appropriate fertilizer mix. When everything is working right, the equipment applies the appropriate amount of each fertilizer element to every area (site) in the field. This is where the words "site-specific-farming" were derived ("site-based management" is the educational analogue). Each site in a field is treated uniquely according to its needs. The old industrial paradigm would "mass manufacture" plants using a standardised, uniform distribution of elements. The new paradigm treats each plant site individually, optimising the mix of elements – what is wanted and what is provided – foot by foot. Let us ask, "If we can apply technology to optimise our farming, individual plant by individual plant, then why can't we apply technology to optimising our schooling, individual student by individual student?"

Once upon a time we farmed and we schooled individual by individual. A farmer walking his fields could treat different plants differently depending on an up close appraisal of what each plant needed. The teacher in the one room school house could treat each student individually because she knew them each as individuals. Then the industrial paradigm took over, both in agriculture and in education. Individual-by-individual craftsmanship was inefficient. We started mass manufacturing both plants and students. Industrial agribusiness worked pretty well at increasing crop yields. Mass manufacturing students according to an industrial paradigm was less successful. It seems that students are less responsive to standardised procedures than plants. One size/dose does not fit all, whether we're talking about fertilizer or arithmetic.

The industrial paradigm works with economies of scale: the more widgets you produce using the very same elements and procedures, the lower the cost per widget. Impressed by the economies of scale achieved by industry, our schools and our farms both fell under the influence of the industrial paradigm. But now industry itself, in our new information era, is yielding to what some call "a post-Fordist paradigm". Using computers and programmable robotics, our manufacturing facilities are achieving economies of scale with much shorter runs. They call it "adjustable manufacturing". Levis can be cut to order using information gathered about individual bodies; Benetton can adjust the mix of dyes and colours upstream

at its manufacturing facilities depending on the colours that consumers pulled off the shelf on any given day. And now even agriculture is yielding to this post-industrial, information-driven, post-Fordist paradigm. Can education be far behind?

For many decades, education was managed according to inputs: how many teachers? How much seniority did each teacher have? How many hours of in-service training? These were the criteria used to allocate resources and adjust rewards. Now, as in other industries like health care, the attention is shifting from inputs to outputs. In health care we hear of “outcomes research”; in education, we hear of standards and accountability.

What precision farming adds to the picture is a portrait of the way the measurement of outputs can be used in real time: “just before dispersal”. It is important to know that one school does better than another at getting its graduates into their first-choice colleges. But how much better it would be if the measurement of outputs could be combined with the detailed, precise measurement of conditions. That way inputs could be adjusted in real time in order to treat each student “uniquely according to his or her needs”.

Efforts at farming once fields have failed – once the nutrients have been stripped, or erosion has taken its toll leaving dust or hard-pan – are likewise unfruitful. So, farmers do not wait for fields to fail. They close the cybernetic feedback loop from assessment to intervention in real time, minute by minute, as combines cross fields, foot by foot. School district turnaround consultant, Karen Hawley-Miles writes:

We already know that most urban schools do not meet state or district performance standards. Student performance is a lagging, not immediate measure of whether schools are providing the kind of instruction that is likely to improve student performance. Estimates of how long it takes to improve test scores range from three to seven years... Reviews of efforts to intervene once schools have failed show that such rescue attempts are unpredictable and expensive. By the time a school has dramatically failed, the cost to turn it around can be high and the time it takes to do so even longer.

Hawley-Miles suggests the need for *leading* indicators of performance rather than lagging indicators of failure. If we can find leading indicators analogous to the evidence of on-the-ground sensors and satellite imagery, then we will gain the “Ability to act *quickly* to *support* and make necessary *changes* in failing schools.”

Let us beware of pushing this analogy too far. Children are not vegetables. Hence Hawley-Miles cautions: “The idea of measuring leading indicators of instructional improvement does not suggest mandating a

particular curriculum, instructional approach or way of organising schools.” Even if we had better measures of success or failure, school by school or student by student, it is not clear that we know what to do with that data. We probably know more about what it takes to grow asparagus under different conditions than we know about what it takes to grow young minds under different conditions. We lack the educational equivalent of a precisely articulated formula for balancing the mix of nutrients needed for maximum plant growth because human beings are far more complex than artichokes. And so much the better!

As we made the transition from the agricultural era to the industrial era, one of the main missions of the public education system – in the United States at least – was to *socialise* children from many different backgrounds. As rural families came down off the farms to find jobs in cities, and as immigrant families came to America from different lands, there was a need to offer a common curriculum that would socialise children toward a common experience of shared citizenry. In the information era, the job of socialisation is largely accomplished by the media. The first signs of this functionality of the media came when families huddled around their radios to hear the first national broadcasts; today, the media beam American culture worldwide. The job of shared socialisation is being accomplished all-too-well for those who would like to protect indigenous cultures.

But this does have its positive impact for it means that the mission of public education can shift: from industrial era standardisation to information era customisation. Like information era farmers, information era educators can afford to treat each student differently, and the differences that make a difference are not only differences in age, income, and ability – analogous to plant heights and irrigation needs – *but also differences in learning style*. As a result of the pioneering work of Harvard psychologist, Howard Gardner, we now have a cogent theory, and an increasing body of evidence, to support the idea that simple measures like IQ as measured by Alfred Binet need to be supplemented by subtler diagnostics on at least seven different types of intelligence – linguistic, musical, logical-mathematical, spatial, bodily-kinaesthetic, inter-personal, and intra-personal intelligence (Gardner, 1985). Skilled teachers have always recognised that some students learn better by listening, others by reading, still others by acting out new ideas with their whole bodies. Now we have a theory that allows us to diagnose and systematise these different aptitudes.

In the future, there is every reason to believe that we will have learning tools that will allow us to diagnose each individual student in ways that will permit us to treat each student, individually, every hour of every day, with just those educational tools and lesson plans best suited to his or her needs and aptitudes. We will have interactive educational computer games that

will automatically diagnose each player's learning style. Such software will accommodate itself not only to so-called "self-paced learning"; it will also permit self-styled learning.

With due respect to the differences between growing minds and growing plants, the force of the precision farming analogy is to underline the fact that we are currently acting as if we do have the formula for raising minds, and it is *one size fits all*. Much of the rhetoric of the standards movement pushes toward industrial era standardisation. The power of the precision farming analogy is to stress the need for more accurate early indicators and assessment tools in order to make non-standard adjustments – granting the fact that we still lack a precisely articulated formula for adjusting our "nutrients" once we have better assessments. (Two recent OECD/CERI publications discuss these questions in detail; one [2006] on personalising education; the other [2005] on formative assessment.)

Another aspect of precision farming might also suggest limits on how far we can push the analogy to precision schooling. When yield-mapping technology first emerged, many thought the goal would be to produce a uniformly high yield. However, the cost of such an approach (both in real dollars and in environmental impact) may lead toward a system that attempts to optimise yield in relation to profit. We may find that some areas should not be farmed. In fact, precision farming may cause farmers to adopt practices that produce even more yield variability than they initially found in the fields. It makes sense to *optimise* rather than maximise or equalise. But educators committed to equity should not be willing to write off a single school or a single student.

Granting such limitations to the analogy, however, it is precisely the distinction between equity and equality that calls for careful assessment of leading indicators and quick interventions. "Equality" can be legislated, and equal dollars per student may flow to different schools. But a closer look at the differing needs of different students – special education, bilingual education, students at risk, and different learning styles for different types of intelligence – shows that the industrial standardisation of "equality" is not adequate. In place of industrial standardisation, we need a more organic understanding of different needs and how to satisfy them. And for that understanding, we could do worse than take a few lessons from the analogy with precision farming. If farmers can grow cornstalks one by one using information to customise their nutrients one stalk at a time, isn't it time that we educate our children one by one, one student at a time?

Equity in education is not achieved by pumping the same inputs into every school. An information age approach to schooling can close the gap by treating each school, each student, differently as needs require. You use

information technology to identify particular needs, and then you meet those needs by using information technology to administer different “nutrients” affordably. Skilled teachers have always known that each child is unique, and they have done their best to teach one student at a time. But skilled teachers have been fighting uphill against over-crowded, factory-like classrooms and assembly-line lesson plans. In order to achieve educational equity in the information era, we need to make a break from the old industrial-era model of mass-manufacturing well-socialised, identical students. We need to gather information about each district, each school, each student, and use that information to adjust the levels of “nutrients” – whether dollars, or teachers, or text books, or computers – as each school, each student requires. As the example of precision farming shows, this is an affordable, attainable dream in the information age.

We have already begun to gather some of the information we need. This is what the educational standards movement is all about – finding out who is doing well and who is not. But the standards movement, at least as it is currently being practiced in the United States, is out of step with the information revolution. It is entirely too focused on standardisation – as if the federal government were trying to tell each and every state and school district how to run its schools. Educational standards could be used to gather information to treat different schools differently in order to achieve educational equity. But, the standards movement has become a stick with which to punish under-performing schools, not a diagnostic tool to enhance the education of individual students. Just as the farmers need those geographic positioning satellites looking over everybody, so we need some national standards as tools of measurement. But we must use that information to differentiate: to customise the spread of nutrients, not to impose some uniform solution.

Differences that make a difference

If our first principle for reform is educational equity, then our second principle, derived from the difference between the industrial era and the information era, is that equity calls for differences that make a difference, not just a uniform spread of the same standardised inputs. A third principle that should guide our retooling of education for the information era is the role of market forces when it comes to spreading valuable resources. Government still has a job to do but it has more to do with assuring that markets operate fairly and properly.

How might market mechanisms apply to public education? School boards and district central offices operate like state monopolies. Parents and students have no other choice of provider, as they would in a free market. In

most businesses a manager can make changes to accommodate the different needs of different customers. But after decades of tough negotiations between school boards and teachers' unions, the public education system, in the U.S. at least, has become hog-tied by hundreds of agreements which forbid teachers and principals from making the changes needed by students. The American public education system is not so much broken as it is locked – frozen into immobility by miles of print in volumes of code sitting on yards of shelves in every state capital. We must unlock this system if we are to unleash the innovation we need to educate our children for the Information Age.

Let's not blame the unions for defending the interests of underpaid teachers. Let's not blame the school boards or superintendents or their staffs in those much maligned central offices. These are for the most part good people trying to do the best job they can. But the game has been rigged in such a way that the harder you play, the more you lose. Teachers lose when the rules will not allow them to be rewarded for jobs well done. School administrators lose when the rules won't allow them the flexibility they need to make improvements. And worst of all, students lose when locked into obsolete, industrial assembly lines that give them no choice among schools or teachers.

We must cut through this educational gridlock and create the rules for a better game, one where students win and teachers and administrators win as well. How to do it? First, we can use the information we are gathering from standard tests and other more subtle diagnostic tools to identify the needs of each student, each school, and each district. Second, we can allow each school to purchase the supplies, the skills, the personnel it needs to satisfy the needs of its students. Because the information we gather will show that some students have special needs, schools should be allocated special funds to meet those special needs. Third, students and their parents can be given the opportunity to shop around for the schools and teachers that best meet their needs. Funding should follow the flow of student choices. Schools that are chosen by unusually high numbers of students with special needs will be given correspondingly larger budgets. Those budgets can be spent on increased salaries for those unusually gifted and heroic teachers who can succeed with students at risk.

A system like this will allow market mechanisms to allocate valuable resources far more equitably than the system now in place. Market forces will reward results – outcomes rather than inputs. Our current system rewards inputs – years of service, courses taken, credentials – rather than proven effectiveness of teachers or schools. The genius of the market is precisely to process information: information about needs and preferences that a monopoly can afford to neglect.

Clearly, markets have their limits. We now know better than to push for the privatisation of everything. Market mechanisms tend to produce winners and losers. Wherever there is a social mandate for universal service – e.g., for communications systems, national security, health care, *and education* – there is a role for governments to play in compensating for market imperfections. But an abiding role for government should not fool us into thinking that centrally planned education monopolies are superior to a combination of market mechanisms and governmental oversight. We should be prepared to pay much more for good teachers than we pay them today. Good teachers deserve to be compensated like other skilled professionals. But we will not be able to free up the funds to reward those good teachers until we break the rule-bound bureaucratic gridlock of most current systems.

If we are going to pay more to those teachers who step in to close the gap between inner-city students and others, where are we going to get the money? A fourth principle says that *urban education is a national crisis that national governments must address*. Our largest cities are national cities, not just the prides of different states or provinces. Some have even called them global cities (Sassen, 1991). New York and London are the financial capitals of the world. Paris and Milan are the fashion capitals of the world. The San Francisco Bay Area is the global capital of the Internet. Sydney and Brisbane serve many needs throughout Southeast Asia. It would be wrong to expect local districts to shoulder by themselves the costs of closing the gaps in their urban schools. This is a job for federal governments.

Still, education is a local responsibility because young children need to sleep in their own beds at night, close to their parents and their local jobs. Unlike manufactured goods that can travel from low cost producers to consumers around the world, schools are as geographically rooted as corn stalks. Children should go to schools in their own neighbourhoods. Like good managers of successful businesses, local school boards should have the ability to make decisions about the allocation of precious resources. The reforms we need will not take the form of some single cookie-cutter plan imposed on all states, all provinces, and all school districts. Quite to the contrary, by introducing market forces into the system, we can allow different districts to purchase the resources they need to meet the different needs of the students they know best. But you cannot send someone to market with no money and then expect market mechanisms to work fairly.

The way the US system is now operating, urban districts are at a disadvantage and a number of states have declared their current educational funding systems unconstitutional because they fail to deliver on the constitutional promise to educational equity. We must right this wrong, but not by taking money away from some to compensate others. Left to their own devices, different states could achieve equity only by redistribution –

levelling to the middle, taking from the privileged to compensate the under-privileged. Because educational equity is a national if not a global problem, federal governments need to get involved to level the playing field by “levelling up” – by giving extra funds to urban districts so that they can come to market with the funds they need.

To summarise the principles that will guide us going forward:

- First, there is equity as the equal right to life, liberty, and the pursuit of happiness which, in the information age, demands an end to ignorance.
- Second, in this information era, equity calls for *differences that make a difference*, not just a uniform spread of the same standardised inputs.
- Third, market mechanisms must supplement down-from-the top bureaucracy when it comes to allocating different resources to different local needs.
- Fourth, while education is a local responsibility, central governments have a job to do to make sure that urban districts have the funds they need to level up.

Putting these principles into practice is a big job. It calls for leadership and local support. We all have a lot to gain – students, teachers, school administrators, parents, and employers – if we can break the deadlock we have inherited from our agricultural and industrial models of education and recognise we now live in an information era with a knowledge economy.

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