Introduction: From Universal Schooling to Universal Learning

Every book has to have a story, a simple story that tells why the author wrote the book, why people should read it, and what the book says. Here is my book's story. In 2006 I was living in New Delhi, working for the World Bank. I had occasion to take an overnight train to eastern Uttar Pradesh to visit an education project that was being run by Pratham, an Indian NGO that works on improving learning of the basics; the program was undergoing a rigorous evaluation by researchers from MIT. The Pratham team would visit a village and do very simple tests of the children's mastery of literacy and numeracy. After a few days of testing, public meetings would be organized to reveal and discuss the results. The locally elected village leader, all the parents of the village, and the government school principal were invited to these meetings.

I arrived at the village meeting just after the results had been presented. They were bad—really awful (though, as we shall see in the next chapter, not atypical). Most fifth-graders could not read a simple story (many could not even recognize the letters of the alphabet), and few

could do simple division. Since the testing had been done by Pratham workers and local volunteers in the children's homes and neighborhoods, by the time of the meeting most parents knew the results for their child. For many parents this was the first time they had had any feedback on what their child was actually learning—or not learning.

At the meeting, a man of about fifty stood up, looked straight at the principal of the local government school, and said, "You have betrayed us. I have worked like a brute my whole life because, without school, I had no skills other than those of a donkey. But you told us that if I sent my son to school, his life would be different from mine. For five years I have kept him from the fields and work and sent him to your school. Only now I find out that he is thirteen years old and doesn't know anything. His life won't be different. He will labor like a brute, just like me."[1]

The man was right. In Uttar Pradesh and the rest of India, and in many other countries around the world, the promise of schooling—getting children into seats in a building called a school—has not translated into the reality of educating children. Getting children into schools was the easy part. Schooling has seen a massive expansion such that today, nearly every child in the world starts school, and nearly all complete primary school (as their country defines it). This expansion of schooling is a necessary first step to education, but only a step.

Education is the preparation of children to assume their adult roles in society as loving parents, as engaged citizens, as contributors to society and their communities, and as productive workers. The premise is that schooling and education are linked: a child who spends more years in school is thereby expected to acquire more education—more skills, more capabilities, more competencies. Yet, tragically, it has been demonstrated again and again that this is not always the case. Schoolin' ain't learnin'.

Division is an arithmetic competency that children are expected to learn. In India, the data from the simple assessments done by ASER in 2009 show that of eight children who enter fourth grade not knowing how to do a simple division problem, *only one* will learn in the fourth grade—which means that seven of eight children will not. The same data show that of five children who enter fourth grade not able to read a simple story, *only one* will learn to do so in fourth grade. This means that four out of five who cannot read when they start fourth grade will not be able to read after they finish fourth grade. The results pertaining

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1. The speaker's words were translated for me.

to year-to-year progress are even worse when conceptual understandings that go beyond rote learning are measured. A nationwide assessment of sixth-graders in India done by Educational Initiatives (2010) found that half could multiply a three-digit number times a two-digit number when the question was posed in the standard way they had been taught it. Yet when children were presented with an arithmetically much simpler question that probed whether they understood conceptually that multiplication was repeated addition, the proportion correct on a multiple-choice test was *worse* than random guessing. An Indian child who finished school at age fifteen in 2012 and who works to age sixty-five will be in the labor force in the year 2062. These children are emerging from primary schooling or even junior secondary or secondary schooling with so few skills that they are unprepared for today's economy, much less for the economy of 2030 or 2062. Their lack of basic education is a burden they will bear for decades.

The problem of inadequate education cannot be solved with more of the same. With so little learning per year, just increasing the number of years children stay in school adds very little learning. Even if Ghana manages to achieve a goal of having every child complete grade nine, if it retains its 2007 learning per year, only 20 percent of children will complete grade nine having more than a minimally acceptable threshold of learning.

More problematic still is that if additional inputs are used as badly as existing inputs are, they will barely budge learning outcomes. Pushing in more of the same standard inputs won't lead to improvements. If your bicycle tire has a hole, pumping in more air won't do much good. This isn't because you don't need air in the tire; it is because you have to fix the hole first, and then add the air. Pumping more books, more teachers, or more training into existing systems is just a palliative measure.

My story then got even more interesting. After the villagers had expressed their poignant disappointment about the consequences for their children of their lack of learning in school, the school principal was asked to respond. He said, "It is not our fault. We do what we can with your children. But you [are] right, you are brutes and donkeys. The children of donkeys are also donkeys. We cannot be expected to teach your children. They come from your homes to school stupid and you cannot expect that they will come home from school anything other than stupid."

In the hullabaloo that followed this insulting speech, it became clear that the principal had no concern for what his students or their parents thought. He had all the power in the relationship, he knew it, and he was not shy about displaying it.

It is frightening that this headmaster's response is typical of the insouciance and brutality of power in top-down modes of government schooling in Uttar Pradesh, and in India more generally, with, of course, variations from state to state. As a leading issue, teachers often just don't show up, or if they do, they don't bother to engage in teaching. Less than half of teachers are both present and engaged in teaching on any given school day (Chaudhury et al. 2006), a pattern of teacher behavior that has persisted despite being repeatedly documented, beginning with the *Public Report on Basic Education in India* (UNDP 1998), better known as the PROBE report. Second, a household survey in India (not just Uttar Pradesh) found that about one out of five children reported being "beaten or pinched" in school—just in the previous month (Desai et al. 2008). More shocking still, the same study found that a child from a poor household was twice as likely to be beaten in a government school as was a child from a rich household. Third, a recent study (Bhattacharjea, Wadhwa, and Banerji 2011) did close observation of classrooms in five states of India (not including Uttar Pradesh) looking for any of six "child-friendly" pedagogical practices—simple things such as "students ask the teacher questions" or "teacher smiles/laughs/jokes with students." In observing 1,700 classrooms around the country the researchers found *no child-friendly practices at all* in almost 40 percent of schools—not a smile, not a question, nothing that could be construed as child-friendly engagement. Fourth, another recent study in Uttar Pradesh (Atherton and Kingdon 2010) compared the learning outcomes of children who had regular civil service teachers and those who had "contract teachers," who were on one-year renewable contracts and were not part of the civil service. The children with a contract teacher learned twice as much a year as children with a regular teacher, even though the civil service teachers were paid three to five times more than contract teachers.

I find that this story leaves everyone outraged, but in two very different ways. One group is outraged by my *telling* the story. If this is you, this book is not for you. The other group is outraged by the story itself and the facts about learning (which I will show in the next chapters are hardly unique to India) and the slow progress. How has the beautiful and hopeful promise of universal schooling led to these tragic results and poor learning outcomes? How can these awful circumstances persist in publicly controlled schools—even in a full-fledged democracy like India? What can we as local, national, and global citizens do to realize the promise of quality education for every child—and not just schooling? This book is for you.

Two key concepts about schooling systems allow the persistence of these terrible outcomes, both of which I introduce with metaphors from the animal kingdom.

Spiders versus Starfish

School systems have become spider organizations. Ori Brafman and Rod Beckstrom in their 2006 work, *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations,* contrast "spider" organizations, which are centralized, with "starfish" organizations, which are decentralized. They propose nine criteria to distinguish centralized from decentralized modes of organization:

Is there someone in charge?
Is there a headquarters?
If you thump it on the head, does it die?
Is there a clear division of roles?
If you take out a unit, is the whole harmed?
Are knowledge and power concentrated?
Is the organization rigid?
Are units funded by the organization?
Can you count the participants?
Do groups communicate through intermediaries?

They adopt the metaphor of a spider because a spider uses its web to expand its reach, but all information created by the vibrations of the web must be processed, decisions made, and actions taken by one spider brain at the center of the web.

The starfish, in contrast, is a very different kind of organism. Many species of starfish actually have no brain. The starfish is a radically decentralized organism with only a loosely connected nervous system. The starfish moves not because the brain processes information and decides to move but because the local actions of its loosely connected parts add up to movement.

In many countries, the legacy system of schooling is a large government-owned spider. These systems are top-down bureaucracies that attempt to control the entire system from a central location at the national or state/provincial level, deciding which schools get built to which teacher gets assigned to what school to what subjects are taught. When spider systems work, they are terrific at logistical tasks. The expansion of schooling is amenable to spiders. If you want to build

100,000 primary schools quickly and at low cost, a top-down program that cranks out standardized schools following a five-year plan is a great way to do it.

There is, however, increasing recognition that lots of problems, perhaps especially those having to do with educating children, are not just exercises in logistics. Spider systems that attempt to force round-peg tasks that require local judgment and control, such as teaching a child, into square-hole bureaucratic organizations can fail, and when they fail, their lack of robustness means they fail completely.

The fundamental difference between spider and starfish systems is not the usual battleground of "markets" versus "government," as critiques of spider systems come from the ideological left and right. James Scott's powerful *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (1998) distinguishes the "high modernism" of top-down spider bureaucracies from the kind of horizontal, traditional practical knowledge manifested in the skills of local craftsmen. Scott, a Marxist political scientist, argues that governments have often failed when they have imposed spiders where starfish were needed. William Easterly (2006), an economist who is very far from a Marxist, has prominently critiqued foreign aid by contrasting "planners" with "searchers," terms that capture many of the same distinctions between spider and starfish approaches. Elinor Ostrom (2008), an eclectic political scientist who won the Nobel Prize in Economics in 2009, attended to "polycentric" systems in which hierarchical power (spiders) does not prevent the emergence of self-organizing systems (starfish).

The Uses of Camouflage

A second metaphor from the animal kingdom important to my thesis has to do with camouflage. Camouflage is a deception that is often key to survival in the animal world. Predators' camouflage allows them to more easily sneak up on prey. Prey use camouflage to avoid and hide from predators. Some animals gain a survival edge through mimicry, sporting camouflage that makes them look like other animals. Some species of flies have evolved to look like bees. The eastern coral snake, which has distinctive black, red, and yellow bands, is highly venomous and best avoided. The scarlet king snake can't be bothered with all that poison and venom, but with its black, red, and yellow bands it looks a lot like the eastern coral snake and scares off predators by mimicking its visual cousin. With mimicry, the form provides survival value without the function.

In the 1980s the organizational theorists Paul J. DiMaggio and Walter W. Powell (see DiMaggio and Powell 1983; Powell and DiMaggio 1991) considered how organizations might use camouflage to enhance their chance of survival. Organizations need legitimacy. When organizations have a difficult time establishing legitimacy, they may resort to simply looking like other, successful organizations. The danger is that if the ecosystem endows both actual performers and their mimics with the same survival value, then systems can lock in to long-term stagnation because the process of ecological learning, whereby performers displace mimics in the population, is blocked.

The particular danger of isomorphic mimicry is that the mimics might look just as good as, or better than, actual performers when both groups are assessed only on inputs and process. In fact, in many schooling systems today, things seem to be getting better, but only because there is so little measurement of actual learning. In India the recent Right to Education Act declared that each child had a right to education—even clarified that the right included a "quality" education—but then defined the "quality" of schools strictly on inputs and process, without any reference at all to actual learning.

The Rise of Spider Schooling Systems

One might argue that spider systems' uniform domination of schooling is in and of itself a compelling argument that spider systems have some powerful performance advantage. If the fittest survive, the survivors are the fittest. Indeed, spider systems do have advantages, but not in promoting learning. Spider systems facilitate the control of socialization, which is in fact their principal rationale. Modern schooling systems were not built as spiders. Rather, historically in the now developed countries schooling arose as a starfish system, with many overlapping and competing national, subnational, local, and private types of schools. Spider systems arose by swallowing the starfish systems. This consolidation had little to do with improved learning and everything to do with the rise of centralizing ideologies and nationalisms.

As I stood in the meeting in the village in eastern Uttar Pradesh, a witness to the principal's brutal indifference and indeed outright hostility to the parents and students he was entrusted to teach, a school bus from a private school drove by the public school, returning children to their homes. I say "school bus," but in fact it was one of the improvised vehicles that India is famous for, painted a bright blue and adorned with other colors.

Uttar Pradesh is still one of the poorest places on earth. According to official statistics, 42 percent of rural Uttar Pradesh fell below India's national poverty line in 2004–2005. Yet there is a rapid rise of private schooling in rural Uttar Pradesh. According to an ASER 2011 survey (see Data Sources for a description of the survey), about 45 percent of all children in rural Uttar Pradesh were in private school. Even though government schools are free—and many benefits, such as a free midday meal, are available only to those enrolled in them—their quality is so low that even very poor parents will turn down a government school in favor of paying the full cost of a private school. Some may view a dynamic private sector as a panacea, a cure for all ills. Unfortunately, education is more complicated than that.

In 1981 Chile radically reformed its system of free basic education in two ways. First, it "municipalized" schools, so that rather than schools being controlled by the national government, each local government controlled its own schools. Second, it instituted a policy that money followed the student, so that private schools that chose to receive public monies (which came with some conditions) could receive more public resources, the more students they enrolled. This privatization led to a sustained rise in the number of students in private schools, so that by 2006 over half of all students in basic education were in private schooling.

In 1999, some eighteen years after the reform, Chile participated in a TIMSS (Trends in International Mathematics and Science Study) assessment of the mathematics abilities of eighth-graders. Chile's average score of 387 (on an Organization for Economic Cooperation and Development norm of 500) was not only well below that of a developing-country star like Malaysia but also below that of Turkey (429) and even much poorer Indonesia (403). Moreover, the tests in Chile that tracked performance found that the scores of fourth-graders at all types of schools were completely stagnant between 1996 and 2002. Twenty years after the massive move to private schools, there was no evidence that the reform had had the kind of dynamic positive impact on the system that many had hoped the increased competition in a private system would provoke.

When a government's spider systems break down, parents cope with the failure by moving to private alternatives, which constitute a parallel starfish system that is both effectively uncontrolled and unorganized and mostly consists of mom-and-pop low-cost schools. There is compelling evidence that when public systems are dysfunctional, the gains to parents of moving to these low-cost alternatives can be massive. But coping alone is not an alternative to failed systems.

Table I-1. Six features of systems of schooling in a progressive educational ecosystem.

Feature	How a starfish system works	Spider systems are the opposite
Open	Many different types of schools provide education, with distinct approaches allowed and encouraged.	Only schools under the spider's control are supported.
Locally operated	Actors are allowed the autonomy to operate, explore, and discover their own ways of operating.	Attempts are made to exercise control over not just the goals and broad parameters but the actual operation, down to the school level.
Performance pressured	A combination of common standards and measurement for "thin" accountability on outcomes from above and "thick" accountability inside schools and inside school communities from below guides development.	Systems are bureaucratically managed, with "thin" accountability on inputs and process, zero performance pressure on learning, and isolation from local control.
Professionally networked	Teachers, the key to any system, are embedded in their school but are also networked horizontally in communities of professional practice.	Teachers are hierarchically organized, both by top-down management and by top-down associations.
Technically supported	The system gives support to schools and teachers to provide them with the capabilities to succeed.	The system provides supervision of compliance, not support or empowerment for innovation.
Flexibly financed	Finance follows students and performance, with local control of allocations.	Finance flows internally, mainly directly to teachers, independent of performance.

Source: Extended from work by Brafman and Beckstrom (2006).

Just being a "starfish" ecosystem is not enough. What are the characteristics of an *effective* starfish ecosystem of schooling? As I argue in chapter 6, there are six key characteristics of an effective ecosystem for schools that produce learning. Such ecosystems are open, locally operated, performance pressured, professionally networked, technically supported, and financially supported. The salient differences between starfish systems and spider systems on these dimensions are summarized in table I-1.

Unleash the Power of Evolution to Change Education

This may seem, and is, a very odd book about education. Unlike nearly all in its genre, this is not a how-to book on education. Attention to the "how to" often misses the point of the "why to" of the agents in the system. The

main value an economist like me—and I am emphatically not an expert in pedagogy or curriculum or classroom management—brings to a discussion of education is through asking two questions: "Why isn't it done this way already?" and "Why will it be done that way in the future?"

That is, when people argue that technique X is a better way to teach, I ask, "Why aren't teachers using X already?" Moreover, if X is a better way to teach and teachers are not now teaching that way, "Why will they do so in the future?" Spider system thinking assumes that the behavior of the entire system is determined at the top and hence changing the spider's mind about the how of teaching will change what actually happens. This leads lots of academics, including many economists, to devote their time to the nuts and bolts of the how without focusing on the why.

Evolution works the opposite way. The how is derived in a variety of ways from a single why. Lots of animals swim—fish, ducks, mammals, penguins, jellyfish, protozoa. The ways an animal can swim are limited only by the properties of water, and so there are lots of ways animals can swim. But they all swim to survive.

Suppose we wanted to increase the average speed of things that swim in a given ecosystem. One might set about to genetically engineer the perfect swimmer. Alternatively, one might just get more sharks in the water. This ups the ante: "Why swim fast?" Those that can't swim fast get eaten and those that don't get eaten reproduce. This produces ecological learning, where overall performance improves. "Planners"—and here I reference again William Easterly's work—want to design the perfect robot swimmer and, once having achieved their designed labor of love, are very reluctant to expose their precious design to any real test of performance. "Searchers" think not just about how to swim but about how to create ecosystems in which better swimming is an emergent property of the millions of choices of individuals in the system: lots of swimmers doing different things, an instructional system in the form of swimming lessons, and just enough sharks in the water to create a clear pressure.

Discovering Principles of Design, Not Blueprints of a Specific House

What would an ecosystem for basic schooling with the six key characteristics introduced above—namely, an open, performance-pressured, professionally networked, financially supported starfish system—look like? That question can be answered by posing an analogous one: What would a well-designed house look like? What a house looks like is limited only

by the imagination of its designers (and some physical constraints). Even if well-adapted houses result from similar principles of design, the concrete expression of the design will be different. Similarly, there are many forms a school can take in a starfish ecosystem:

— *Community-controlled schools.* Groups of parents affiliated with the most local level of government may open their own schools (subject to some requirements) and attract students to the school.
— *Private providers.* For-profit and nonprofit private entities provide schooling, with some formula for how public sector resources are to follow the student.
— *Schools under small governmental jurisdictions.* Control is allocated, resulting in a level of autonomy that is close to the level of the school.
— *Charter schools.* Entry to operating such schools is strictly regulated, but once chartered, schools (even if they are still government schools) are allowed much greater autonomy than regular government schools.

The Rebirth of Education

If a modern Rip Van Winkle had gone to sleep in 1912 and woken up in 2012, he would have been bewildered and disoriented by the vast technological, economic, and social changes in the world. Overwhelmed and ill at ease, where could our 1912 Rip go in 2012 and feel right at home? He could visit a school. He would recognize the buildings, he would recognize the classrooms, he would recognize the content taught. He would recognize the organization inside the classroom, the pattern of the school day, the internal organizational structure of the school itself (a principal and teachers). More deeply, almost anywhere in the world he woke after his long sleep he would recognize the system of government-owned and government-operated schools.

The legacy systems of large-scale government production of basic schooling that span the globe, as central as they were to the social, political, and economic developments of the twentieth century, are now obsolete. Government-owned spider systems of schooling arose more than a century ago to prepare children for the "modern." Or, as Margaret Mead put it presciently in 1943, their purpose was to "turn the child of a peasant into a clerk." Spider systems of schooling arose to prepare children economically for the "new" world of Henry Ford's River Rouge factory,

organizationally for the "new" world of the Prussian army and the British railroads, politically for the "new" world of the expansion of the voting franchise via the British Reform Act of 1918, and socially for the "new" world of the consolidation of ethnicities into nationalisms and nation-states. However, this new world for which the modern school was designed is now a very old—and obsolete—world.

The mismatch between the education that children need for the world they will face and what legacy systems of schooling can provide is growing. Open, locally autonomous, performance-pressured, professionally networked, technically supported, and flexibly financed starfish systems of education build on the legacy systems that successfully provided access to schooling, to give children the education they need for the century they will live in.

But everything comes at a price. The price of starfish systems is not financial—again and again, disruptive innovation in starfish systems provides ways to produce more learning with less money. The price of better education is allowing freedom, giving choices, and hence ceding power. This is a price that must be paid by the powerful, not known for their largesse. The purpose of the large, centrally controlled spider schooling system was to limit choices: of teachers about how they would teach, of students and parents about what they would learn.

Starfish systems must be open and locally autonomous, and that opens the way for choices, by parents and students, by headmasters and teachers. Choice means freedom and freedom means power. Schooling systems cannot prepare children for a future of freedom, diversity, and creativity in the absence of freedom, diversity, and creativity in the way education is provided.