

Re-Engineering Education in America

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Introduction

For some years now I have been growing less optimistic about current efforts at school reform and improvement. After 35 years as a professional educator and researcher, many of them spent working in teacher education programs with frequent and intensive visits to schools, I have come to believe that the problems with schooling run much deeper than the assumptions behind our reform efforts. As I have shared these concerns with colleagues and various groups in the US and elsewhere, I have been surprised to find that they strike a responsive chord with many dedicated educators. I am still thinking through these issues, and I have agreed to put them in print now, expanding an earlier unpublished essay that has been sitting on my website for a couple of years. I hope that sharing these concerns more widely will stimulate a more profound debate in our community about how to really re-make our ways of providing support for students' learning.

The Issues

Education, we should remember, is not the same as schooling. Education consists in what a community does to promote learning and understanding of what it values. Schooling is a particular technology for doing education in some human communities. It is a very old technology. I believe that today it is largely dysfunctional and that schooling is seriously in need of radical re-engineering if we are to succeed with education.

I want to describe just how schooling is dysfunctional today as an educational technology. I want to argue that it is beyond reform and repair and that it is urgent that we begin to develop more effective alternatives. I will sketch some ideas for what such alternatives might realistically look like, how we might get from here to there, and what we need to know in order to create a new educational future.

I have been for more than 30 years a professional educator. I have done widely-read research on education in schools. For most of my career I worked in teacher education. I have also seriously studied theoretical physics, discourse linguistics, and social theory and made some minor or not-so-minor contributions in these fields. I'm not criticizing a school system I don't understand. I'm not unaware how little investment in schooling the powerbrokers of our society have been willing to make in recent decades. And I don't underestimate the difficulties of providing education in a highly diverse society that is painfully lacking in its real commitment to social justice. But still, for the sake of

education, and a better world, the system we have now needs to be replaced with something that has a better chance of working.

What Does Effective Education Require?

It is surely a strong claim to say that contemporary schooling is dysfunctional beyond hope of repair. After all, it does in some respects function right now for many students. Or it seems to do so. If the purpose of schooling is to promote education, and education consists in learning and understanding what a society values, then the most fundamental criterion for judging schooling must be its relationship to what we really value in education. About this there is no doubt some disagreement in contemporary society. All my claims, though not all my criticisms, depend on the view I take of what we do and ought to value in education.

There is not, I think, much disagreement that education should prepare all students, and particularly the next generation, for a future that will be significantly different from the present, both inevitably in the course of history, and specifically because we hope the next generation will change our world for the better. We also agree that the storehouse of human knowledge, both practical and conceptual, is likely to be of some use in the future and should not be lost or left to gather dust in books because no one knows how to use it. But where we may not all agree is in what we think it takes to apply that knowledge to make a better world, and to extend knowledge as needed, or just for the pure joy of it.

I believe that in order to use knowledge for high purposes people need (1) deep understanding, and (2) critical perspective.

Deep understanding means that you have taken the time to examine a subject in depth. That you have looked at it from many points of view. That you have seen how it can be applied across a wide variety of contexts. That you have questioned its basic assumptions and identified the limitations of what is thought to be known. It means that you know a lot about it, that you know the details, and that you know where the bodies are buried. It means you know something about the history of the subject, something about the philosophical issues relevant to thinking about it, more than a little about its role in society and the economic and political interests that impinge on it or which it potentially affects. You understand it abstractly and you understand it concretely. You can talk about it in many different ways for many different audiences. You can represent it in many different ways to yourself in your own thinking. You can find ways to bring it to bear on other people's problems and issues, in collaborations.

Critical perspective means that you think about a subject in relation to basic values and not just in relation to matters of fact or explanatory adequacy. It means not just that you question whether something is so, but also ask how particular knowledge functions to make the world a better place or a worse place, a more or a less just place. It means thinking not just about the subject, but about why that subject is studied, and why it was studied in the past, by whom, and how it contributes value and for whom. What values it contributes to and what values it may detract from.

Without deep understanding, knowledge serves only as a social marker, a signifier in social situations that you've managed to get some sort of superficial education, an index of your position in society. It functions in the same way as your clothes, your car, or any other ornamental decoration that tells people where you fit in. If you try to use it for practical purposes, you are likely to make big mistakes and learn the first and lesser meaning of "a little learning is dangerous thing."

Without critical perspective, knowledge is an invitation to dogma and hybris, to pride, over-confidence, and complacency. It tends to make us part of the problem because we don't bother to identify that there is a problem. Knowledge apart from values is knowledge divorced from its social meaning, because values are always about what is good for more people than just me. People to whom our present social system is not kind do not lack critical perspective: they are quite sure from their own experience that there is a problem, and that the valued knowledge of their society is not helping to solve it. People to whom our society is kind enough, or kinder than we deserve, need to be taught critical perspective by being exposed to realities, questions, and challenges from which we would otherwise be sheltered. People whose critical perspective comes only from personal experience, however, also need to be taught to see a wider view. Social problems are not solved from individual perspectives. Trying to apply knowledge without a critical perspective on it will lead you to learn the second and greater meaning of "a little learning is a dangerous thing."

So how is our present system of schooling doing, when judged by these two criteria for serious education? How well is it providing opportunities and support for students to pursue deep understanding of anything? How well is it providing an education that inquires into matters of social values, critically and from both a personal and a wider societal perspective?

How is the next generation going to make this a better world without that kind of education?

The Structural Faults of Modern Schooling

So far, thinking about education has suggested what we want education to be. How do we make it happen? How are we currently trying to make it happen? What is so wrong with how we're doing it now that I don't believe modern schooling as such can be fixed?

Schooling is a very old technology for education. At least since the time of the ancient Sumerians more than 4000 years ago, students have been gathered into large rooms, by the dozens, under the direction of one or a very few teachers, to learn a fixed and standardized curriculum of specific knowledge. In general they all learned the same knowledge, at the same pace. In fact the basic content of the curriculum has not changed a lot in 4000 years. The basics of reading and writing. The basics of arithmetic.

Vocabulary. Geography. Religion. Higher mathematics. Accounting. Anatomy. Botany and zoology. Astronomy. All these were in the ancient Mesopotamian curriculum, the ancient Egyptian curriculum, the Greek and Roman curriculum. Later times added history, literature, and the newer physical sciences. The details changed. The methods of teaching basically did not. The organization of the school added two innovations in modern times: separating students by age, and giving them a new teacher every year (if not sooner).

Thirty students in an empty room with one teacher. In a building that has no other function than to house and support what happens in those empty rooms. Add to the empty room a set of textbooks, and maybe some maps or charts on the walls. What do teachers and students do in these rooms? For the most part they talk, listen, and write. Traditionally the teacher does most of the talking, writes out an official knowledge, which is copied down by students. All the students are the same age to within one year. Very often they have fairly similar social backgrounds and life experiences. The teachers also are a pretty homogenous bunch, compared to the diversity of our society as a whole. The students, past the early grades, change teachers and subjects every hour in the course of a day, and every few to several months in the course of year.

What is wrong with that picture? We live in a complex society in which a myriad of different kinds of knowledge and forms of human activity take place in different institutions, different walks of life, different jobs. Which ones is schooling preparing students for? all of them? or none of them? Why do we imagine that in a society as complex and diverse as ours that you can learn what is important and valued in our society by sitting inside an otherwise empty classroom, by spending all your days in just one building? We bring in books and pictures, slides and films, television and the Web. But those are very poor substitutes for observing and participating in at least some of the millions of real activities in real places in our society. No other buildings are as empty as schools, except perhaps for prisons. We do not bring other people into schools for the most part, and even if we did, they would be fish out of water, unable to demonstrate what they do in their jobs and lives, able only to talk. Students would not be able to observe or participate in what they do, only listen and maybe see a picture here and there, at best a short movie. Schools and classrooms are impoverished learning environments compared to any office, factory, farm, hospital, courthouse, laboratory, department store, or even prison. Teachers spend their lives teaching. Mostly, they have little basis for teaching about what goes on in any of the rest of the world's jobs and professions, though we can be grateful for those for whom teaching is a second career.

But suppose a teacher did bring experience from outside the school and university, as all to some degree must do. In what moments would our present system of schooling with its time-filling curriculum requirements and high-stakes testing allow the teacher to share his or her personal and professional experience with students? Is it obvious that knowing the names of the stages of cell division is always and exclusively more important than knowing what the building engineer does in the basement of the school? Or what your teacher experienced while on active military duty in a warzone?

The curriculum must be followed. The curriculum must be covered. Leaving no time for anything else. Indeed the sheer quantity of information contained in the curriculum makes sure that there is no time for any other kind of learning. And what is the evidence that the contents of our new and highly touted standardized curricula are actually of value to all citizens? There is no such evidence. In fact, so far as I know, there has never even been any research to determine what knowledge is of widest value to most citizens in our society. From time to time something new is added to the curriculum because some few people have convinced some other few people that it's important. The so-called standards-based curriculum is not itself part of "evidence-based education". It is based on no evidence at all regarding the empirical value of its content, certainly not its content beyond the basics of the early grades.

Should all citizens learn the same things in the course of their educations? My answer to this is no. Beyond some elementary knowledge in the first four or five grades, there is little common knowledge which is of sufficient value to most people that learning it should displace the opportunity to learn what you are interested in and want to learn. Our curricula are, infamously, "a mile wide and an inch deep". They actively obstruct deep understanding. If a student encounters something of interest and wants to learn more about it, s/he cannot because "we have to move on" to the next superficial topic in the curriculum.

Not only does the emphasis on superficial coverage of standardized curricula prevent deep understanding and the development of engaged student interest in learning something, but it also prevents long-term learning. Very few students do long-term projects in which they learn how to learn, learn how to organize knowledge, learn how to do research, learn how to compare different opinions, learn how to synthesize knowledge, learn how to present to others what they have learned. And they almost never do long-term projects that can grow and develop beyond the few to several months of a single class.

Students are not supported in the long-term development of their educations. Not with regard to their interests, and not with respect to their strengths and weaknesses either. By the time a teacher gets to know all 30 students in a class, it is time for them to change to another class and another teacher. How can a teacher be a real teacher to a student, when their relationship rarely lasts even one year? What kind of mentoring and counseling are possible in such a system?

Usually students also find themselves in their next class with a different set of classmates. That may sometimes be good for some students, to get away from annoying peers, but it also means that there is little opportunity for building longer-term student-to-student relationships, except in extra-curricular activities.

Students have classes only with their age-peers. What kind of preparation for social diversity is that? Educational research has shown time and again that cross-age tutoring and other forms of learning with students who are younger or older is highly beneficial for both the older and the younger learning partners. Human beings evolved to learn (and

in most human communities always have learned) in mixed-age settings. The evidence that age-homogeneous learning is in general superior to mixed-age learning is non-existent. At the very least, students should have opportunities to learn in both sorts of settings.

And not just with students who are a year or two older or younger, or even several years, but also with adults of a variety of ages, in mixed-age settings that more closely resemble real life. What sort of preparation for life is learning only in classes of your age-peers? What kinds of learning are best done in homogeneous settings? and are these the kinds of learning that we most value?

In fact, all these dysfunctional features of schooling as an educational technology function to minimize student resistance to a curriculum that for the most part they detest, and with perfectly good reason. It is not a curriculum that is serving their best interests. It is a curriculum that is enforcing tradition for tradition's sake, and insuring that each next generation of students will be ill-prepared to critically re-examine our society and ill-prepared to work to change it.

Here then is my bill of particulars indicting the dysfunctional features built into the structure of contemporary standardized-curriculum schooling:

- Standardized curricula do not leave time for the development of individual interests, deep understanding, or critical perspectives
- Curricular scheduling does not leave time for long-term mentoring by teachers or long-term project-based learning by students
- Segregation of students by age precludes the benefits of learning in realistic mixed-age groups
- Classroom-based education promotes artificial learning over learning from participation in real, diverse social activities and settings
- 30:1 student-teacher ratios trivialize the work of teaching and require all students to learn at the same pace
- School-based education isolates students from contact with a diverse range of adults from whom they could learn

- The content of standardized curricula beyond the early grades has no justification in terms of usefulness for most adults
- Schools are empty buildings full of empty classrooms where there are no rich learning environments
- Schools isolate students from participation in other communities of practice which do offer rich learning opportunities

Beyond Repair?

What would it mean to repair or reform the existing system to remove these faults? I think the reasons why a reform agenda is just not tenable should be clear from my account of the faults themselves, for they are very fundamental features of the schooling model. Nevertheless, a few further arguments.

If we were to scale back the quantity of topics in the required standardized curricula, exactly the opposite of the present reform trend, to allow more time for students to study particular topics of interest in depth and with critical perspectives, then I don't think we could also maintain either the present systems of accountability (standardized testing) or of instruction (whole classes being taught uniform subjects). We would lose the economies of scale of mass education. Teachers would need to follow every student individually, or each small group, and be prepared to support their learning across a vast range of topics. How would we ever prepare teachers to undertake such responsibilities? We need to make a fundamental choice: teaching the same topics to everyone, or finding new ways for students to learn particular topics of their own interest. Over the years of elementary and secondary education, we can imagine striking different balances. Surely there are some things all students should learn, and this can be done with improvements to the present system, but I believe this strategy can succeed only in the first four to five years of schooling (say to the fifth grade at most). Beyond that, curricula become more and more an arbitrary selection of topics of interest to fewer and fewer students and precluding their study of other topics, of equal or greater social value, that are of greater interest and so of greater potential use to them in the future. Whatever more advanced concepts really are fundamental in some very general sense, just to the extent that they are fundamental, will inevitably be encountered by every student, no matter what specific topic they choose.

The job of teaching is beyond any single teacher, at least past the earliest grades. In our present system we give students sets of several teachers in a year, each specialized in one area of the curriculum (and with perennial shortages of well-prepared teachers in many areas), which the teachers can master only because the content is standardized. Even so, in most schools, teachers who share the same student have no time to talk with one

another, unless the student has become "a problem". What is needed is for students to have access to a much larger number of adult mentors over the course of their educations, and to different degrees. The old saying that "it takes a village to raise a child" remains true even in our global village. We cannot delegate education entirely to a small number of specialists and expect it to work. Every member of society, old and young, must take some responsibility for educating others. In our millions we must be available, some small fraction of the time, to colleagues and peers, to apprentices and interns, to online chat buddies and in more formal mentoring relations, as experts and as advisors. And still some few of us as master teachers who help students to co-ordinate and integrate their many learning experiences and the input of many teachers.

We learn from those younger than ourselves, especially as we teach them but also from what they ask of us and how they do things differently. We learn from our peers, when we understand something better and help them out, and when they return the favor, as well as when we work together collaboratively. We learn from those a little older than ourselves and those much older than ourselves. We learn one-on-one and in larger mixed-age groups. A classroom model with one teacher cannot equal the potential of education as a member of the village and as a participant in its multiple communities.

We learn both by participation and by reflection. We learn both concretely and abstractly. But our present educational system is very heavily biased toward learning by abstraction, without much time for reflection, while most people learn best by participation. The four walls of the classroom cannot contain, and cannot adequately simulate, the activities in which we would learn best by participation. There are, again at the earliest grades, some things that are best learned in a classroom. As the ancient Sumerians discovered, basic reading and writing skills, basic arithmetic skills, can be learned in this way. But the initial steps in reading, writing, and arithmetic are only the beginning. Reading science is not just reading words; you need experience of the phenomena and procedures of science to understand what a scientific text says, deeply and critically. Writing history or literature is not just writing words; you need to understand the communities of practice that give rise to literary and historiographical texts. Most writing is not academic at all. It is deeply embedded in the context of everyday activities (both ordinary and professional) and makes sense only in relation to those activities and the norms and values of the communities of practice that create any particular text. No school, no classroom can ever contain the whole world, or even any very richly complex part of it.

Everyone knows that students do not naturally learn at the same pace, or in the same ways, much less with equal enthusiasm for all subjects. Why have we then continued to require students to learn at the same pace? in the same ways? the same topics and no others? Years of research established that students learned better when matched to teachers who used the instructional approaches the students found best fit them. Almost no school matches teachers and students in this way. We know that what a student cannot learn when forced to move rapidly through a subject like mathematics or chemistry, they could learn far better if given a curriculum that moved at half the pace. Almost no school offers variants of courses that are differently paced (only remedial courses that start with simpler content and prepare students to try the standard course, usually not very

successfully). Reforms along these lines might be of some use, but the basic problem is that our mass-production model of education-on-the-cheap cannot achieve its economies of scale except by rejecting individualization of instruction or anything approximating very closely to it.

Put all these faults and obstacles together and I think the conclusion is inescapable that modern schooling is dysfunctionally designed, if its purpose is to support students in learning with deep understanding and critical perspectives. Many modern observers have in fact concluded that its true functions are quite different (custodial baby-sitting, preparation for mindless labor and political docility) precisely because it is so obviously ill-suited to its primary function.

Let me add one note in response to a common conservative defense of standardized curricula: that they lay the foundation for shared values in a diverse society. I find this rather a hypocritical argument in defense of a system of schooling that assiduously avoids any serious explicit examination of social values. Insofar as there are nonetheless implicit values in our new national curriculum, especially in its choice of content and methods of teaching, they are not my values. Nor are they the values of hundreds of millions of Americans who do not understand or do not subscribe to the influential minority subculture of upper-middle class, middle-aged, male, heterosexual Americans of Anglo-Saxon and northern European heritage. For those are the only values to be found in our standardized curricula, always masquerading as universal values or "Western" culture. They represent an anti-intellectual lie which we should be ashamed to offer as the basis for education in a society whose greatest asset is precisely its rich social and cultural diversity. But, frankly, it ought not to matter. Despite the ideologies of nation-state building in Europe and the U.S. in the 19th century, societies are not held together by common language or shared cultural values. They are held together by mutual interdependence among diverse subgroups and social categories. We stick together not because we are alike, but because we need each other. And to the extent that we are taught that what matters is how alike we are, we put the social fabric at risk and encourage the ethnic divisiveness, racism, homophobia, sexism, age discrimination, and class denigration that are the real dangers to American society and always have been.

How Else? Towards Alternative Educational Systems

So how else, after forty centuries, can we do it? In those 4000 years, people have thought of other ways, and so have we in the modern world. There are, after all, such things as libraries, reading circles, apprenticeships, internships, field trips, research projects, self-study, home schooling, service learning, automated tutorials, intelligent computer-based tutoring programs, learning by doing, cross-age tutoring, after-school centers, community art and theatre projects, etc., etc.

We can identify, I think, a few rather basic ways to learn, and so a few basic approaches to education:

- read a book or surf the web for information
- ask a friend or an expert to explain something
- tinker with things and try to figure them out
- get a group together to find an answer or make something happen
- watch other people doing something and try it for yourself
- explore a new territory, alone or in company
- talk to people
- write and make diagrams, drawings, movies, music, multimedia
- invent new things or ideas of your own
- compare different ideas and experiences
- ask why? and how? and how else?
- all of the above, in various different combinations

I have called schooling "a technology" because for me a technology is not just some material devices, but also a particular way of using those devices for a purpose. A device can be small like a pencil, or large like a rollercoaster or a school. New educational technologies do not mean things like television or computers. There must also be new ways of using pencils, rollercoasters, televisions, computers, and even schools. I don't think we should get rid of teachers, or school buildings, but we have to find new and better ways of utilizing them. I do think we have to get rid of their monopoly on education, or what is strangely called "formal education", leaving every other setting and way in which people learn to be somehow considered marginal and trivial. Students, and people generally, learn in museums, zoos, aquariums, supermarkets, department stores, banks and bootcamps, too. We also learn by reading books they won't allow in schools, by playing games that are supposed to be bad for us, and by talking to people our parents don't like. Of all the things I've learned in my life that I value, very few were learned in school, and most of those that were were learned outside the standard curriculum. I learned a lot from a few teachers, and very little from many others. Your experience may differ, and probably does, which is why we need to provide for a variety of different ways in which different people can learn.

Imagine that after the fifth grade students get to set aside an increasing percentage of their total learning time for activities of their own choosing. This is time not spent in

normal classrooms. It has to have a stated purpose and some specific goals. It has to be evaluated by a teacher or mentor. Records of what you did and what you learned have to be kept. The activity can be something you devise on your own, or it can be chosen from a list of offerings from "accredited" organizations. It might be a supervised internship. It might just be regular observations in a community setting and time spent discussing these with a teacher, a mentor, and other students. It might be a research project. It might be self-study. It might be analyzing an online computer game you are playing with a group of friends. Some record of what you learned is added to a portfolio.

Imagine that after the ninth grade, only about a third or less of your learning time is governed by a curriculum. Another third is self-selected activities. And the last third is guided activities, recommended or prescribed by a long-term mentor who is working to fill in the gaps, to correct weaknesses, to build on strengths, to expose you to aspects of life and society and learning that you may have missed or not become interested in so far on your own.

Imagine that every student's education includes substantial real-life experience outside the school in a variety of different social settings. That it also includes learning how to learn independently and study on your own, critically using information sources from books to film to online multimedia. That it also includes working in small collaborative learning groups and project teams, over both shorter and longer periods of time, to accomplish specific goals. That it also includes time for reflection, discussion, critical examination, sharing experiences, and comparing points of view in a quiet setting apart from the normal activities of social life. That it also includes long-term mentoring by more than one mentor, as well as shorter relationships with teachers and with specialist consultants and online mentors and experts. Imagine that it includes learning by teaching someone younger or less experienced than yourself.

Imagine that every student's education includes the bare minimum of common shared knowledge and information, determined by actual research to be useful to a large majority of people in our society, and that beyond this every student's education is unique. Imagine that every one of us learns some different portion of the storehouse of human knowledge and the ways of doing things in our society. And that we all also learn how to share what we know with others, how to work together in groups, pooling our different slices of knowledge and know-how, to make a whole that is more than the sum of its parts. That each of us actually has a deep understanding of what we know, and a critical perspective on its value implications and potential problems. As much, anyway, as we can have at any stage of our lives and educations, and given our interests and talents.

Imagine that there are ten different models of what such an alternative educational system might look like, but that each of them remedies the basic defects of the system we're now using and that each of them implements a thoughtful strategy to achieve deep understanding and critical perspective.

What more do we need to know in order to develop such alternative models to the point where we can confidently try them out?

A Research Agenda toward New Educational Systems

I believe there are two broad classes of questions for which we need better answers in order to create effective alternative educational models:

- We need to understand better how to help support students in integrating and cumulating learning across many different modes and settings.
- We need to understand better how large-scale social institutions like schools change or come to be replaced by successor institutions.

We already expect students to integrate learning from one class to another, hour by hour through the day, with no help from the school. They go from science class to math class to social studies to English, and despite the manifold and important potential relationships among what they are learning in each separate class, each subject takes responsibility only for itself and no one takes responsibility for helping students integrate and cumulate all this learning (or such learning as they manage) into something more.

Within each class we also expect them to integrate learning across many media of communication, from teacher talk to peer discussion to paragraphs from textbooks to writing on the board. In some classes we also expect them to learn from charts and diagrams, from hands-on activities, and from specialized media. Teachers do try to integrate all this, but we still don't really know how to help students do so because we just don't know much about how humans do it, or how some do it better than others.

Students are already also learning outside of school. They are learning from family and peers, they are learning from the mass media, they are learning from advertising in all its overt and disguised forms. They are learning from popular culture, commercial culture, and peer culture. And schools are ignoring all this learning that students are doing, keeping our noses buried in the standardized curricula and our eyes closed to what our commercial and peer-group competition is, often very effectively, teaching our students. We also know very little about how students integrate, or don't integrate, the learning in different aspects of their lives. Insofar as many of them say that learning in school is irrelevant to their lives outside school, presumably they aren't getting much practice at this kind of integration now.

Any new educational system built along the lines I've suggested will have to work very hard to help students integrate learning from school-like discussion groups, online self- and group-study, small-group project work, observations and internships in non-school settings, and a host of other activities ... including many over which the educational system will never have any direct control. I believe that a significant portion of students' and teachers' time in the future will be dedicated to promoting critical reflection on these

many different kinds of learning experiences and how they do and don't fit together: what questions they raise about each other, what they add to one another, what contradictions they present, etc.

We are all always learning across media, across sites and activities, and across timescales from the learning we do in a minute to the learning that takes us years. To get an educational system (or several educational systems) that systematically promote learning for deep understanding and critical perspective, we are going to need a more systematic understanding of how this integration works.

Of course we can already begin to imagine such alternative educational systems. But how can we get there from here? Schooling is by far the largest single institution in our modern society. It enrolls about one-third of the total population (counting universities which also suffer, if less comprehensively, from many of the same faults as schools). There are tens of thousands of schools in America, hundreds of thousands of teachers. There is a vast economy of textbook publishing and a vast bureaucracy of school officials. Schooling is an institution that has resisted significant change for 4000 years. Are we going to change it in a decade or two?

No, we are not. Massive social institutions do not undergo fundamental change on short timescales. Either they evolve slowly, very slowly, or they are more rapidly replaced by competing institutions, or they compromise with new institutions and form hybrids of one sort or another. They can, however, also suddenly and inexplicably collapse.

Our present school system could collapse. If the legal conditions were present, and to an increasing extent today they are, to allow parents to choose other forms of education than schooling for their children, the system could collapse if there were (a) a failure of public confidence, and/or (b) a really attractive alternative. Collapse of public confidence in institutions happens: in banks, in governments, in churches and cults, in businesses and products. Attractive alternatives might emerge from combinations of excellent computer-based commercial courseware and home-schooling organizations operating like miniature charter schools, without charters. The wealthy have never trusted the public schools and their curricula, and today are protesting vehemently against the dumbing-down of their elite schools to meet the standards-based requirements. The upper middle-class has similar sentiments and could desert the public schools for something less costly than private academies, but producing at least equal test-score outcomes (which would not be hard to do for upper middle-class students). If the upper middle-class goes, the middle middle-class will want to follow in order not to lose advantages for their children in future competition. If universities, first the elite privates and then their competing state schools, begin to accept alternative credentials for entrance, buttressed by their own examinations, public school diplomas could lose most of their credentialing value. The nightmare of many social planners, that the public schools will be left to the poor and the working class, with little political clout in the competition for resources, could well happen, and lead to, if not a complete collapse, at least a disastrous contraction.

Facing even the beginnings of such pressures, school systems might react by relaxing their requirements to permit compromise solutions: students spending part of their time in schools and part of their time learning in other ways. If the competing organizations (and there will inevitably be institutional organizations to support any alternative mode of education) and the schools get into an extended competition for students, each will be trying to offer something the other does not have. Such a scenario could lead to a genuine diversification of the modes and settings for learning.

These are dangerous paths. The natural, accidental evolution of something as large as our system of schooling could easily lead to social disaster, at least for the most vulnerable segments of society. We need to have some better understanding of how such massive changes take place, and what the viable alternatives are. We need to prepare some responsible plans for alternative educational models before history compels us to do so under potentially very adverse circumstances.

We are already in a reactionary period in educational policy and planning. The evidence of the ineffectiveness of schooling in meeting even the needs of a post-industrial labor force has already been obvious to corporate leaders for decades. In the absence of any worked-out alternative, and in fear of what might happen if the system were loosened up too much, conservative planners have tried to take the system back to where they imagine it was in the 1950s. The current conservative reform movement could itself trigger a collapse by forcing too much rigidity, by exposing the deep inadequacies of the system even measured in its own meager terms, by cutting off innovation, by alienating privileged parents who know that the standardized curricula do not constitute the education their children need for the 21st century. Every structural weakness, every dysfunctional feature of the present system is being exacerbated by the present reforms.

At the same time, conservative ideology is following its own logic that the schools need competition to keep them healthy. Competition from privately managed education, from charter schools, from home schooling, from ambitious community colleges, from commercial courseware deriving from new enterprises outside the traditional textbook publishing world. The commercial software industry is biding its time, waiting for the right political moment to show what it can do. It knows, I think, that what it does best is not really compatible with how schools operate. Either schools need to open up new spaces, or other organizations need to give software manufacturers political cover to come in and eat up the schools' market. I think we will see these new organizations appear first, and then a response from the schools. If that response is not conciliatory and compromising, the odds go up for a collapse of schooling. If schools move towards co-existence, then a more gradual transformation is likely and a hybrid system could emerge for most students.

I am not going to argue here for particular futurist scenarios. I am more concerned with (1) what we ought to be doing, and (2) what more we need to know to help design and implement alternative educational systems that can do what we ought to be doing. Most of all, I would like to see multiple, different models of what alternative systems might look like and how they might work in practice. So far we are not developing such models

because of the fear that once it becomes publicly thinkable that schools may not be the last word in human history on how to do education, everyone who can flee the schools will do so as quickly as we can, triggering the collapse.

The result has been a conspiracy of silence and disingenuous optimism. It is the special responsibility of the academy, and particularly of researchers who study the field of education, including schools, to say publicly that we cannot afford as a society to continue the fiction that the present public school system is the only option we will ever have. If we focus our attention solely on reforming schooling, we may hasten the collapse of the school system and invite a subsequent state of educational chaos which will only benefit those with the resources to ride it out. We need to start preparing now for a radical change in how we educate people in this society. We should not be arguing about whether a collapse is imminent or likely, because that is not the problem. If it lasted stably forever, our current model of education by schooling and standardized curricula would still be dysfunctional for our real educational objectives. We need well-articulated, well-researched alternative models that can be debated and tested. We need a better understanding of the economics, politics, and social dynamics of large-scale institutional change. If we really want a better world, isn't this a good place to start?

Related and Recommended Reading

- Aries, P. (1962). *Centuries of Childhood*. New York: Vintage.
- Diepstraten, I., du Bois-Reymond, M., & Vinken, H. (2006). Trendsetting learning biographies: Concepts of navigating through late modern life. *Journal of Youth Studies*, 9(2), 175-193.
- Gunderson, L., & Holling, C. S. (Eds.). (2002). *Panarchy: understanding transformations in human and natural systems*. Washington, D.C., USA: Island Press.
- Lave, J., & Wenger, E. (1992). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Lemke, J. L. (2000). Across the Scales of Time: Artifacts, Activities, and Meanings in Ecosocial Systems. *Mind, Culture, and Activity*, 7(4), 273-290.
- Lemke, J. L. (2002). *Becoming the Village: Education across Lives*. In G. Wells & G. Claxton (Eds.), *Learning for Life in the 21st Century: Sociocultural Perspectives on The Future of Education* (pp. 34-45). London: Blackwell.
- Lemke, J. L., & Sabelli, N. (in press). *Complex Systems and Educational Change: Towards a New Research Agenda*. *Educational Philosophy and Theory* (Special issue, December 2007).

