

What's Needed for Effective Education Reform

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Introduction: My Purpose in This Essay

As I take a break from the field of education, I would like to record my thoughts on the shortcomings of our present education system (by which I mean both public and private schooling from kindergarten through university in the United States as of the year 2011) and my suggestions for repairing it. I do this not necessarily with any hope that my advice will even be noticed (much less followed) but more because doing so will give me a sense of closure as I leave my current position to pursue a graduate degree.

When setting out to improve an institution, one ought first to consider its purpose—not just what the originally stated (or implied) purpose was to begin with, but what the purpose *ought to be in the context of our present needs*. Then, of course, one must analyze the workings and the fruit of the institution to identify specific areas in which it falls short of achieving its purpose and to determine the reasons for these shortcomings. Finally, one must formulate and implement remedies that will resolve the identified problems.

Sometimes only small problems will be found, and correspondingly small fixes will be required. Other times, the institution may be found to have systemic problems that can only be solved by rebuilding it from scratch, or at least performing a drastic overhaul. In the case of our present education system, little analysis is needed to see that we are in the latter situation, and drastic measures must be taken if we wish to have an effective system that is appropriate for the times. I believe that the changes proposed in this essay would constitute the sort of overhaul necessary to create such an effective system.

In order to keep the reader more engaged from the start, I will present my ideas in reverse order. First, I provide a list of suggested changes, wherein each suggestion is accompanied by a brief discussion of the particular shortcoming that it addresses, along with my reasoning behind why it will work. Following that is a section about why the currently available means of bringing about reform will never be able to take us to our desired destination (i.e., the complete revamping of our education system). At the very end is a discussion of the purpose of education, wherein I

conclude that the *de facto* purpose of our current system is as much to assign a numerical value to the quality of each student's mind as it is to expand said mind.

Happy reading.

Suggested Changes

1) Do away with numerical grades entirely; instead, test only for mastery.

My first suggestion is that we scrap our current numerical grading system. In our current system, as you are of course aware, students are assigned a percentage grade for each piece of work that they turn in. The work is likely divided into categories such as homework, quizzes, tests, and projects; and these categories are likely to be weighted differently so that, for example, a test will affect a student's grade more significantly than a quiz. At the end of each grading period, all of the percentages are averaged together (according to the weighting of the categories); and at the end of a course, the averages from each grading period are averaged together, perhaps with a final exam score tossed in, to yield a final, overall grade for the whole course.

The problem with this system is that such a percentage grade is close to meaningless. The most obvious shortcoming is, for example, that if we have a student at a public high school in New York who got an 87% in Algebra and another student at a private school in California who got a 79% (also in Algebra), these numbers give us no clue as to how these students' skill levels in Algebra compare. They had different homework assignments and took different tests; their work was assessed using different rubrics and standards; the weightings of the categories were different; and on top of all that, supposing they were even using the same textbook, one student's class might have made it through only the first six chapters of the textbook while the other made it through all twelve chapters. With just this one example, we can see that if a student has an 85% in a course, we *cannot* conclude anything at all along the lines of, "This student mastered approximately 85% of the course content."

The matter is further complicated by the different types of assignments that teachers give and the different ways that they grade the work. Some teachers routinely give grades for things like “having your binder in class today,” or “returning a form after getting it completed by your parents.” Don’t blame the teachers; for some groups of students, giving grades for such things is the only practice that keeps a classroom running smoothly. Nevertheless, the result is that a significant portion of a student’s grade very often has nothing to do with the degree to which the student is mastering the skills that the course is intended to teach.

Another common practice is the completion grade. Once again, you might be tempted to blame the teachers for being lazy if they give completion grades, but if you consider a teacher who has 180 students and is expected to give homework assignments every other night, the teacher has to choose between not grading the assignments at all—in which case most students won’t bother to do them—or giving completion grades. In any case, students take advantage of such assignments to pad their grades as much as they can.

But completion grades aren’t the only source of padding. Teachers have to guide students through the development of a new skill step by step. You might start with two or three relatively easy skills and test your students on these skills before moving on to the actual target skill, which involves putting these two or three skills together in a tricky way. On the first test, students average 90%, but on the test that assesses the target skill, they average 70%. Average these together and it’ll look like they got 80% of what they were supposed to learn, but in fact the only skill that really mattered was that final one on which they scored 70%. Even within a single test, students *expect* the first 50% to 70% of the problems to be easy—either review of old skills or trivial applications of new skills. The result is a lot of padding, even within individual test and quiz grades; students can often get a passing score without actually mastering the new target skills. Then they move on to the next unit, and the same thing will happen. At the end of the year, few if any of the target skills will have been mastered, but students will still pass the course with grades that say they’re doing well.

Some school districts don’t even allow teachers to give grades below a 50; if a teacher enters a 0 or a 40, the grade book software automatically

changes it to a 50. Another common policy is the mandatory retake. If a student gets a 30 on a test, state law requires that the student be allowed to retake it; but, having seen the test before—even if it was a different form—a student is likely to end up with a 70 on a retake; and that 70 is clearly not equivalent to a 70 on the original test.

You might be thinking, “Well, at least within a single classroom, comparing grades ought to be meaningful.” But even this is not necessarily true. You can get a kid in math class who masters the material perfectly and, because she knows she’s got it down pat, doesn’t do the homework assignments. It turns out that this is not because she’s lazy but because she needs that extra time for her English and history classes because she’s an immigrant from China who still has a lot of trouble with the language. Even though she’s mastered the math skills, her math grade is lower than another kid who completes all his homework assignments with the help of friends and turns them all in for full credit, more than making up for his lower test grades. Or you get a kid who routinely turns in homework late because he wants to take the extra time to make sure he really nails each skill; but the teacher either doesn’t accept late work or takes off 50% for late work, and once again the student’s grade goes down even though he’s actually mastering the material better than a lot of the other kids. Such instances are more common than you might think.

As I mentioned in the first example, different teachers cover different amounts of the requisite material over the course of a year. It’s disturbingly common for a teacher to make it only halfway through the curriculum. And, once again, it’s probably not the teacher’s fault. More often than not it’s because they have to remediate holes in their students’ previous year(s) of learning before they can even begin the subject that they’re supposed to be teaching. As a result, you can have a kid with a 95% average in a class that only made it through 40% of the curriculum and another kid with a 75% who made it through the whole curriculum. I wouldn’t even begin to know how to compare their abilities based on these numbers.

Similarly, a student’s total deficiency in one topic within an overall subject might get washed out in the average. For example, in a pre-calculus class a student might completely fail to understand the laws of sines and cosines. These are extremely important parts of the subject, but they make

up only one unit out of the whole curriculum. A student could get 40's and 50's on the tests and quizzes related to these particular skills but do pretty well on other topics in the course and end up with an 84% average for the course. Thus, the overall grade of 84% gives the student (and everyone else) the illusion that he knows the subject of pre-calculus to a pretty high degree, when in fact there is a huge deficiency that's hidden by the number.

To sum up, percentage grades fall dreadfully short of reflecting how much of the content of a course a student has mastered. For two students at different schools—or even for students with different teachers at the *same* school—comparing grades is meaningless. Even within a single class, grades don't always give a reliable comparison of students' level of learning. Furthermore, there is an appalling amount of grade inflation, for various reasons, with the result that grades are poor indicators of student achievement. From individual tests to entire course averages, grades give students an illusion of achievement that might or might not correspond to any real achievement.

“What's the alternative?” you might ask.

My proposal is that we introduce a system that has only two possible grades: “Has Achieved Complete Mastery” and “Has Not Achieved Mastery.” You might protest that this is precisely what the percentage grade system is intended to do; and I would agree that it is *intended* to do this, but it fails miserably. In the current system, “passing” is set at a particular number, usually 70%, a threshold which is a bit arbitrary in itself and is rendered shamefully meaningless in light of everything that I have just pointed out above.

If not with percentages, then how do we determine whether a child has achieved “mastery” in a certain skill? The Khan Academy, which integrates computer software in both the practice and assessment of skills, has a good starting model for this. For example, a student achieves mastery in a particular math skill when she can correctly solve 5 problems in a row using that skill. This is just a starting point, but it's a good one. We must require not just short-term mastery of a skill, but long-term retention of a skill. The student must still be able to solve 5 problems in a row a week or a month or a year later.

A grade of “mastery” for an entire course should only be awarded when every specific skill within the course has been mastered. Thus, a course may need to be divided into, say, twenty, or even a hundred, specific skills. Each skill must be developed to the point of mastery before the course is mastered and thereby passed. This works best if students are allowed to progress at their own paces since some will inevitably get stuck on certain skills and require more time to master them. This has been difficult in the past, but with technology, a learn-at-your-own-pace classroom is now feasible. Once again, this has been demonstrated in classrooms using the Khan Academy’s software, with students all proceeding at their own pace while the teacher serves as a guide and tutor for each student rather than a lecturer who holds every student at the same point in the curriculum.

This is a point worth stressing: In the traditional classroom, everyone is always on the same page (or at least chapter) in the textbook. When the teacher lectures, all students are forced to go at the same pace. Inevitably, some kids who could go much faster are held back to the average pace of their classmates, while some kids are pushed ahead before they’re able to master the previous topic. In such a classroom, *everyone* loses except for the kids who are right in the middle. Some kids get completely lost, and some kids are held back. But in a classroom in which every child is pursuing mastery of skills in sequence, one skill at a time, at their own pace, we can create a situation not only in which no child is left behind, but in which many children are empowered to get farther ahead than would have been possible otherwise.

The assessment systems do, of course, need to be standardized, but once again this is something that is easier to accomplish now than ten years ago because of advances in technology. Databases of questions, sorted by subject, skill, and other characteristics, can be made available nationwide. With a large enough database, it’s not even necessary to keep the questions confidential. A kid would have to get his hands on thousands of questions and learn the answers to them in order to gain an advantage on the actual test; but by then he will have actually learned the material, which was the goal in the first place.

In such a system, grades become meaningful. Colleges and employers would see transcripts that say, “Student X has mastered the following skills,”

and they would actually be able to draw accurate conclusions about what the student can do. Also, the students themselves would have a better understanding of how much they've really learned. Whereas a student who makes an 80% in a course might not really know whether he mastered the subject (or, worse, he might have the *illusion* of having mastered it, since the system tells him that he passed if he scored higher than 70%), the same student who has received a grade of "mastery" in an entire course would know for sure what he has accomplished. Even on an individual test, a student would no longer get the test back, glance casually at the top of the paper, and, seeing a red "78%," put the paper away without looking elsewhere on it, thinking, "That's over; I passed." Now a student will look at a test paper and see the words, "You have not yet mastered the following skill." The student would be sure to go back and fill in all the gaps.

2) Test for long-term retention.

One of my eleventh grade students was having trouble with a word problem. I tried to walk her through it using the Socratic Method and breaking it down into smaller pieces. Finally we had gotten to the point where she would be done if only she could solve the equation $x^2 = 9$.

"Now how can you solve that?" I asked.

"I don't know," she said. "Divide?"

It sounded like a random guess. She really didn't have a clue. Rather than just give her the answer, I tried to prod her in the right direction, and, most importantly, to get her to think about the reasoning behind her proposed strategy.

"Well, what would you divide by?" I asked.

"Divide by squared?" she asked.

Either this girl is proof that the warm-and-fuzzy "Every child can and wants to succeed" axiom is false, or she had slipped through the system. This girl had "passed" Algebra I; but clearly, either she had never been required to demonstrate mastery of squares and square roots, or she had never been

required to retain what she might once have learned about squares and square roots.

I had another student in my pre-calculus class who asked me what the difference was between “3 times u ” and “ $3u$.” He was a senior who had “passed” Algebra I, Geometry, and Algebra II. How had he made it this far without knowing the most basic notation for multiplication? Several teachers must have given him passing grades when he had either never mastered multiplication to begin with or had never demonstrated retention of it.

These examples pertain to several of my suggestions: that we do away with grades, that we test for retention, that we test for mastery, and that we allow students to fail (i.e., actually hold them back if they haven’t learned a subject). If these students had been tested on whether or not they had actually mastered these skills when they were supposed to learn them, and if they had been held accountable (i.e., held back until successful), they would not have had these deficiencies when they made it to my class. But because they had been passing their math classes without mastering skills, and because they were not allowed to fail, they were actually just getting farther and farther behind each year. Or maybe they *had* mastered these skills but then forgotten them, in which case, someone had failed to test them for retention.

As a beginning pre-calculus teacher, I had somehow gotten the radical idea that in order for a student to pass pre-calculus, she ought to be able to demonstrate that she had *permanently* acquired the skills under the umbrella of pre-calculus. I was imagining that students ought to be able to enter a math course at the next level (calculus) and *not* have to spend the first three months relearning pre-calculus.

This idea was completely foreign to many of my students, who were shocked that their “final exam” would *actually* include material from every chapter we had covered that year. This was because they had learned, year after year, in nearly every course they had taken, that on any given assessment, they would only be tested on material covered in the past two, *maybe* three, weeks. They had mastered the art of short-term retention of

knowledge and skills but had never been required to review and solidify their understanding of older material.

This is why the first *five chapters* of my district's pre-calculus textbook were almost entirely a review of Algebra II. My class didn't arrive at any genuinely new material until the fourth month of school because they had retained so little from the previous year's course (partly because most of them had only "mastered" enough of the skills at the time to get a B or a C on tests that were already easier than they ought to have been). Let me be clear that this is due to shortcomings in the way the whole system is constructed; it is *not*, as you might be quick to conclude, because the previous year's teacher was ineffective.

It is essential that the previous suggestion (do away with grades, and test for mastery instead) take into account this suggestion. Mastery of a skill is only worthwhile if it is retained. Alternatively, one might instead say that one hasn't truly mastered a skill until one has reached the point at which he can continue to perform the skill over the long term. Thus, students *must* be given cumulative exams that require them to prove that they have retained skills that were learned earlier in the school year; and remediation must occur for topics in which they fall short—*before* they are allowed to move on.

3) Do away with grade levels.

Classes should be categorized by two main characteristics: the level of material being taught, and the pace at which the material is covered. Kids ought to be placed not according to "grade level" or age, but simply according to which subject level they can handle and which pace is appropriate for them.

Grouping by skill level is essentially what is done now, but current schemes tend to depend a bit too heavily on age and "grade level," with the result that many students are placed in courses that they're really not able to handle, simply because they are of the age at which that particular subject is normally studied. At the same time, some students who are ready for more advanced subjects at an earlier age have to wait until they reach the "appropriate age" for the subject, and their intellectual development is thus stunted.

Our system would be more effective for all students if they were placed according to skill level. (For social reasons, I admit that it might still be a good idea to segregate by age in some situations. For example, if you have forty students of various ages who are all at the same skill level, it might be beneficial to split them into a younger group and an older group. And of course, our system *does* do this to some extent.) Proper placement does, of course, depend on effective testing. In particular, in order to advance a level, a student must prove both mastery and retention of prerequisite material. At the same time, it is absolutely necessary to hold back the kids who have failed to demonstrate mastery and retention. These kids will not benefit from sympathy and corner-cutting just for the sake of moving them along to the next grade with their peers. They'll just end up feeling even more lost the next year, and they'll be holding their peers back as well.

Just as important as placing students at the right level is placing them at the right *pace*. Whenever possible, classes should be divided according to the pace that the students can handle. Students who need to proceed more slowly do *not* benefit from being pushed along at a pace at which they are unable to master material. They'll scrape by with a C and then move on to the next level even more ill-equipped for it than they were for the previous level. Similarly, students who can move at a faster pace will be held back by their peers who need a slower pace. The faster students will come away with glowing grades, thinking that they're doing great, when in fact they've been prevented from realizing their true potential.

As I said, students should ideally be grouped according to the pace they can handle. But it might also be possible for them to receive instruction at their own pace if the means of differentiated instruction are available. This might be possible in a "flipped" classroom in which students proceed through lecture videos or instructional software at their own pace at home (or at individual computers in class) and then get individual guidance from the teacher during class time, which should be spent on independent and group practice. This is not possible if the teacher is lecturing on a given topic each day; this traditional strategy automatically keeps everyone on the same page at the same pace.

The problems with asking an individual teacher to provide differentiated instruction to a large group of students are that a teacher (1) can't give multiple lectures each period on the topics that different students are currently studying, and (2) can't prepare multiple assessments for students who are all at different levels. Even if a teacher is using pre-prepared assessments (as from a previous school year), once the more advanced students have taken those quizzes and tests, those quizzes and tests are no longer usable with the other students who will arrive at those topics later on. In order for this to be done effectively, a huge database of assessment materials for all different topics must be available and as automated as possible (so teachers don't have to pick and choose new questions from a question bank for each quiz or test for each student).

The ineffectiveness of placing students who need to proceed at different paces in the same classroom is most obvious in summer school programs when older, slower kids who failed a course and have to retake it are combined with younger, faster kids who are trying to get ahead. These kids shouldn't be mixed together. No teacher can meet the needs of both groups at the same time (without extensive development of the methods and tools described above). Either the kids who are behind are just going to be left behind again, or the kids who are ahead will be held back to the pace of the slower students. Some people might say that seeing younger kids mastering the subject might motivate the older kids to try harder; but it's actually more likely to make them disengage even further.

Maybe you agree with me so far. But why abolish grade levels altogether?

A typical student has strengths and weaknesses. Some kids are strong readers and writers, able to devour literature and crank out fantastic essays at an astonishing rate. Some kids master grammar at an early age. But maybe math and science are a lot harder for them. Or, of course, it could happen the other way around.

Our current system tends to have a standard set of courses for each age or "grade level" based on the assumption that every student should be progressing at the same pace in all subjects. In ninth grade you study geography, in tenth grade world history, in eleventh grade US History, and in

twelfth grade government and economics. Some kids might be equipped to breeze through these subjects early but not math and science. Rather than being an “eleventh grader” who is taking the standard “eleventh grade courses,” each student should be studying the subjects that she is ready to study. There should be no such thing as an “eleventh grader” or a “fifth grader.” Instead, each student should only be able to say something to the effect of, “I’m sixteen years old, and I’m currently studying US history, chemistry, and calculus.” This would be particularly appropriate for the diverse community that we have here in America, in which there are, for example, immigrants who are just learning English and know nothing about American history but have a strong background in math and science.

The benefits of such a system include that it would eliminate the stigma of falling behind, and it would allow students to proceed at different paces in different subjects. As things are now, there is often great pressure on teachers, parents, and students to do whatever is necessary to move up to the next grade level in order to avoid the shame of being held back. Often the result is that students are moved ahead when they’re not ready. Certain key grades are inflated, and the next year the students will be in classes for which they’re not prepared.

4) Do away with the all-or-nothing high school diploma.

In addition to doing away with grades and grade levels, I believe we ought also to rid ourselves thoroughly of the idea that every student must satisfy a one-size-fits-all set of requirements to attain a status of “having received a high school diploma.” In place of the traditional diploma, I propose that each student be awarded a transcript on which are recorded all of the subjects or skills that the student has mastered, and the level of mastery attained.

There’s a huge amount of pressure for students to “move on” to the next grade level and, ultimately, to graduate—pressure from parents, administrators, the government, and even teachers’ own consciences. An individual school’s funding might be threatened by denying kids a diploma. A kid’s prospects in life will change dramatically if he fails to get his diploma. For parents it’s a matter of pride and hope for their child’s future. For all of these reasons and more, we’ve ended up with what almost amounts to a de

facto “mandatory graduation” policy: get kids to graduate, whatever the cost. All kinds of ways are found to bump grades up to that artificial 70% threshold so they can get their diploma.

Consequently, a high school diploma doesn’t mean much.

Certain officials have proposed a “mandatory passing” policy, requiring kids to be allowed to retake any test they fail *and to receive a passing score on the retake*. The rationale is that this will force teachers to “make sure” the student learns the material for the retake. Passing rates will go up, and graduation rates will go up. The officials who made the policy will be able to say, “Students are performing much better since I came into office.” But of course, those students aren’t learning any more now than they were before. All that’s happened is that the “passing grade” and the “diploma” have been significantly devalued.

Remember my student, the 18-year-old senior in pre-calculus who didn’t know that $3u$ meant “three times u ”? He was passing all of his other classes (though I don’t know what that really means). If I had failed him, he wouldn’t have gotten his diploma. My conscience wouldn’t let me keep him from receiving his diploma. I gave him a passing grade. One could argue that I *shouldn’t* have. It was a pre-calculus class, and he had not learned pre-calculus. In reality, he didn’t pass.

Strangely, there were other seniors that year who were taking Algebra II—in other words, they hadn’t even made it to the subject of pre-calculus. And yet, because they passed their Algebra II class (some of them with 70’s), *they* were allowed to graduate. Why should my student be required to pass pre-calculus in order to get his diploma when these other kids only had to pass Algebra II? There’s clearly something wrong with the system here.

Ideally, this student should not have been in this “all-or-nothing” position. He should be able to graduate with a transcript that doesn’t have pre-calculus on it. Taking away that pressure that comes with the all-or-nothing diploma would free up conscience-bound teachers to give failing grades where failing grades are deserved. The students would not be crippled for life by not having graduated. You won’t have the stupid situation

wherein one student passes Algebra II with flying colors but then fails pre-calculus and is denied a diploma, while another one never even *makes* it to pre-calculus and just *barely* passes Algebra II and gets a diploma.

You might protest that without the pressure to obtain that all-or-nothing diploma, students won't be as motivated to succeed. My response to this is that my proposed "Transcript of Mastered Knowledge and Skills" will generate more motivation than the traditional high school diploma. Let me explain why.

In an age in which just about everyone is expected to get a high school diploma, that diploma does little to differentiate one graduate from another. Furthermore, possession of a diploma itself doesn't actually prove mastery of a single subject. In a system where teachers are pressured like never before to pass all of their students, it's pretty easy for kids to choose the easiest teachers and then coast through all their coursework with a C average, learning close to nothing (except that school sucks).

Perhaps more importantly, both students and employers *know* that the diploma doesn't prove mastery of any skills and that many of the required subjects of study are in fact irrelevant to the performing of one's job. Whether you get a job in sales at Best Buy or as an electrical engineer at Texas Instruments, those hours you allegedly spent analyzing *The Scarlet Letter* (though we all know that you actually only read the CliffsNotes or SparkNotes) won't make a difference in your ability to perform your duties.

On the other hand, if, rather than a diploma, every student comes away with a transcript showing what skills she has mastered, then (1) students will be aware that the more skills they bother to master, the more they'll stand out from their peers, and (2) employers will have something to look at that actually reflects what the graduate can *do*. Knowing this, students will be motivated to build a good transcript for themselves, at least during their final few years of school when they're old enough to start caring.

Note that the current system is the opposite of what it should be with regard to course grades and diplomas. In the current system, graduation is a binary thing—you either get your diploma or you don't—while your score for an individual subject is a meaningless number on a near

continuum. Things *should* be the other way around. You should be able to graduate anywhere on a near continuum with a “Transcript of Mastered Knowledge and Skills,” on which your grade for each *subject* is binary—you either mastered it or you didn’t. This way, graduation would no longer be an “either you did it or you didn’t” affair. Rather, it becomes a celebration of reaching whatever level you were able to reach.

5) Allow students to fail—tests, units, subjects, and high school.

The enormous amount of pressure that is placed on teachers to pass their students has highly detrimental long-term effects. Kids who actually aren’t learning anything often scrape by with C’s for their course average due to lax standards, pressure from parents, and pressure from leaders. Schools look bad if their passing rates are low. The state looks bad, which means that politicians look bad. People’s jobs, district funding, and reelection are at stake. The obvious “solution” is to increase the passing rate, and the easiest way to do that is simply to let more kids pass.

Observant kids learn that they’re not likely to fail a class even if they try (to fail). There’s just so much padding built into the system and so many safety nets. The problem is that the padding and nets don’t actually do anything to improve *learning*. Rather, they just allow kids to pass with lower levels of achievement. As a result, a passing grade is not very meaningful.

Policies that are allegedly intended to improve the education system end up making it even more dysfunctional. Often, politicians or superintendents just want to be able to say, “Look, the passing rate went up while I was in office.” Then we end up with things like grade minimums (when a student doesn’t even *turn in* an assignment, he still can’t be given less than a 50) and mandatory retakes.

The pressure to get a passing grade needs to be shifted (partly) off of the teachers and onto the students. Kids need to learn to work for and earn their grades. Yes, teachers must be accountable for effective teaching, but students also need to be accountable for active learning.

Passing grades will become much more valuable when kids are allowed to fail. If students must demonstrate mastery and retention, and if they understand that there is a real threat of failing if they *don’t*

demonstrate these things, then they'll work harder. The possibility of failing has to be real, though.

6) Make the curriculum narrower and deeper.

Every time a new study highlights the deficiencies of our education system, lawmakers tack on new requirements. Ironically, these measures that are intended to improve the system actually make it worse. The curriculum gets inflated, both in terms of the number of "skills" that kids have to learn within a given subject, and in terms of the number of subjects that kids are required to study. Teachers and students are overwhelmed by a curriculum that's a mile wide and an inch deep.

Consider one particular formula sheet that students are given for the math portion of a state test. There are far too many formulas on it. For example, there's a formula for the area of a regular polygon with n sides. Then there are *two* formulas for the surface area of a *pyramid* that has such a polygon as its base—one formula for the total surface area, including the base, and another for just the "lateral" surface area (the sides without the base). There are numerous other redundant and, quite frankly, *useless* formulas on the chart as well.

The problem is not that students are expected to know how to calculate these quantities, but that *they are expected to need the formula* to calculate them. Virtually no mathematical reasoning is required to plug numbers into such a formula. For example, if you need to calculate the area of a polygon, you can just count the sides, measure the apothem (the distance from the center to the midpoint of a side), plug these two numbers into the formula, and you're done.

Now, you might be thinking, "Actually, that's not trivial to me. I don't know what an apothem is, and I wouldn't have been sure whether I should use the distance from the center to the *midpoint* of a side or from the center to the *endpoint* of a side." I'm behind you one hundred percent. You should never have to depend on trivial, memorized factoids such as, "The apothem is the distance from the center to the midpoint of a side." Neither should your kids. When we do this, we're training them to memorize little bits of

information—which they’ll no doubt forget within a year anyway—rather than to exercise *problem solving skills*.

What should we do differently?

In the case of this example, students should be taught that you can divide any regular polygon into triangles and just add up the areas of all the triangles. The same can be done to find the lateral surface area of a pyramid—each face is a triangle. And if you want the total area of the pyramid including the base, just add the area of the polygon to the area of all the faces. Figuring out how to put these things together is the sort of basic problem solving skill on which students should be tested, rather than remembering what an apothem is and plugging it into a formula.

Some memorization and some formulas are necessary, of course—the area of a triangle, for example. So let’s provide them with that. But rather than teaching kids to mindlessly apply a whole string of other redundant formulas, let’s teach them a powerful strategy that they can use to find the surface area of all kinds of objects. *That* is real mathematical reasoning.

I imagine that the real problem here is that an expert is sitting in an office somewhere deciding what kids need to know how to do. This person is making a list, part of which undoubtedly looks like this:

- Be able to find the area of a regular polygon with n sides.
- Be able to calculate the *lateral* surface area of a pyramid with a polygon base.
- Be able to calculate the *total* surface area of a pyramid with a polygon base.

I agree entirely that students should be able to do these things. But they need to be able to do them by applying mathematical *reasoning*, not by blindly plugging numbers into a formula without having any idea why it works. So it’s not really the expert in the office with whom I take issue. It’s the person who looked at that set of learning objectives and said, “Therefore, we need to teach kids to use these formulas.” No, no, no! If anything, we need to teach kids to break shapes up into triangles and *derive* these formulas! It’s actually not difficult, but a lot of people can’t do it simply because they’ve

been taught that they need to be given formulas in order to solve such problems.

That's just one example on a very small scale within a single subject. The point I'm making is very general, though, and it's this: Students are being taught to memorize gigantic numbers of factoids and formulas, which they regurgitate on tests and then promptly forget. As a result, they don't gain much from a year's study of a given subject. They're only able to solve problems that follow certain templates, and they freeze up when they encounter a new type of problem that they've never seen before.

What they *should* be doing is memorizing only a *small* number of axiomatic principles and *strategies* that they can use as tools to solve *all kinds* of problems. If you teach a kid the formulas for the surface area of five different shapes, then he can only solve five different problems. But if you teach a kid to break a shape up into triangles and add up their areas, he can now solve an infinite number of problems, even with shapes he's never seen before!

This problem happens on a larger scale as well. Recently, Texas instituted a new "four by four" requirement, which requires every high school student to study four years of math, four years of science, four years of social studies, and four years of English. In the past, you could stop taking science after reaching a certain level. Now you're required to keep taking science all the way through your senior year. As a result, our students are getting a poor understanding of a greater number of subjects.

This fails to address the problem. Kids were already not learning Algebra II. Now they're being thrown into an equally ineffective pre-calculus class that they're not prepared for. Is this going to help them succeed? Of course not. Allowing them to be done with a subject they're not interested in (or good at) and specialize in something else would actually serve them much better. Instead, we force them into more classes that they won't learn anything from. But since the safety nets are in place to virtually guarantee that these kids will pass, it doesn't matter to the policy-makers—on *paper*, the students will appear better educated.

7) Make the curriculum more practical.

Most math skills are presented in a way that's entirely removed from any realistic context. Kids are forced to learn about polynomials and logarithms and trigonometry, often with only a few painfully contrived attempts to relate these things to real life. Understandably, they often ask, "When are we ever going to use this?" Usually the honest answer is, "Never, unless you go into science or engineering."

The way material is presented to students is actually only part of the problem. A disturbingly large part of the problem lies in what material is taught. So much of it is just not practical. There's a lot of theory with very little practical application.

I was a straight-A student in high school, especially strong in math and science. I won a National Merit Scholarship, and I majored in math and physics in college, graduating magna cum laude. And yet, in many ways, I feel useless. I've got a lot of heady, fascinating knowledge about electromagnetic fields and quantum wave functions, but I'm at a loss when I confront a car or microwave or dishwasher or even a toilet.

Now, I'm willing to take a good deal of responsibility for certain shortcomings in my own education, but after a good bit of looking around, I've realized the problem is not just with me. It's largely in what's taught. And this is a problem in every subject, not just math and science. But let's look at science first.

A lot of kids do quite well in their physics class, but in the end they still don't know how to light up a Christmas bulb with a battery. What is it that they're learning, then? A lot of abstract calculations involving Newton's laws, Ohm's law, and [insert name here]'s law. But it turns out that most of the students are never actually connecting these abstract things to real life applications. They don't apply these concepts in taking apart, repairing, and building things.

A real education has to involve, at some point, taking stuff apart and figuring out how it works. Kids don't do that nowadays because of the following reasons:

(1) They grow up in environments where they're "protected" from having to get their hands dirty (companies provide wonderful products that do things for us); furthermore, many of us have certain pernicious cultural attitudes: we think that tasks involving plumbing, electrical wiring, and basic construction are beneath us.

(2) Technology has advanced to the point where even simple devices are not readily accessible. Electronics are black boxes with unknown components and unknown processes. In the past, you could take something apart, see its components, and see them working. Now you just see a box that can't be opened and has a warning stamped on it, saying, "Warning—electric shock hazard; warranty void if opened." And even if you *do* open the box, you'll find a circuit board with microscopic components that you can't identify, much less tinker with.

All of the fascinating abstract principles and mathematical manipulations are wonderful for expanding the mind and all, but they're not very useful if you're not getting a practical education at the same time. Surely the purpose of education should not be just to fill students' minds with heady theoretical knowledge, but also to give students some practical knowledge and skills that can be used at home or at work. In order to achieve this purpose, science classes absolutely need more of this basic, hands-on sort of activity.

As I said, this problem exists in every subject.

In English, for example, what used to be grammar, the mechanics of good writing, persuasive writing, etc., evolved into the study of Greek classics, poetry, and novels. These things are wonderful and certainly have a place, but they are also—I'm sorry to say it, but it's true—impractical everywhere outside of academia. People nowadays don't know how to use the word "whom," and they think that any time you mention yourself with another person, you have to call yourself "I." (As in, "Just between *you and I*, this is atrocious!")

Schools used to provide serious, hands-on, practical courses such as wood shop and home economics. Useful skills were taught: using machines, building things from wood and metal, electronics, sewing. Such courses are

rare now. The only comparable class at my school was a computer class, which, ironically, was marginalized and not considered a core course. Yet the skills taught in it—typing, formatting documents (letters, etc.), making spreadsheets and databases—perhaps ended up being some of the most useful skills I learned in high school.

So what is the root of this problem?

I believe it stems from the fact that curriculum authors are “experts” in their fields—people who are locked in an ivory tower with their heads in the clouds, who have no connection to how things are used in real life applications. Consequently, the subjects taught in school have gotten more and more separated from their real world context and have evolved into theoretical pursuits.

Curriculum development starts with the question, “What do kids need to be able to do?” The natural authority to turn to is the “expert”—most likely a university professor. The problem here is that most university professors have spent their entire careers in academia. They’re not out in the same world where most students are going to end up—with jobs in the industry. Ask a humanities professor what students “need to know,” and he’ll probably go on about novels, poetry, Greek classics, and philosophy. Ask a corporate manager what skills people need in order to be effective employees, and you’ll get an *entirely* different answer.

Yes, there’s a place for that mind-expanding theory and abstraction that goes on at the heights of the various subjects. But when we write the curriculum for the masses, we need to consult not just the experts in academia but also the people out in the world who are building roads, writing software, making policies, etc.—because those are the things that, most likely, our kids are going to need to be able to do in the future.

8) Allow (and *encourage*) early specialization. *Reduce* the number of required courses.

As I mentioned before, policy-makers’ reflexive reaction to every report that’s published on our education system is to say, “We need higher standards! We need to require kids to study more mathematics and more science!” Subsequently, the number of math and science courses that every

student must take is increased. Unfortunately, this actually exacerbates the problem.

Higher standards are good; but they must be well-crafted so that they actually bring about the desired effect. Requiring students to study every subject for a greater number of years utterly neglects the painfully obvious truth that *in real life, everyone specializes*. This is a truth that our education system ought to reflect.

The kids who were performing poorly in their math classes—i.e., failing to understand polynomials, logarithms, and trigonometry—were unlikely to enter a field involving mathematics *anyway*. (Yes, there are exceptions. I'll discuss the main one later.) But now that these kids are required to take higher-level math classes—which they *know* they're not going to use—the kids who *are* planning to go into science or engineering end up with these lower-performing students in their classes holding *them* back. The same can happen in any subject. The result is that all students are held back to the pace of the average, or worse, slowest student.

Continuing with math as an example, there are certain key skills that everyone should be expected to know. The subjects of basic algebra and geometry—made narrower and deeper, of course, as described in the above section—should certainly be required. People should be able to represent real-life quantities with variables and set up basic equations to solve common problems. People should certainly be familiar with basic techniques to calculate angles, area, and volume. But the vast majority of topics covered in Algebra II, Pre-Calculus, and Calculus—logarithms, inverse trig functions, and integrals, for example—will not be used by most people. The people who *will* end up using these things are the students who would continue taking higher level math classes *even if they were not required*.

The same could be said of English. Good grammar, style, punctuation, formatting, spelling, and reading comprehension are essential skills for everyone. But the skills involved in literary criticism and poetry analysis are, for students who don't plan to be professional artistic writers, not only unnecessary but unappreciated.

I anticipate a lot of protesting here: Surely the great canonical novels and poems *are* necessary, and we're cheating kids if we don't force them to study these things. Yes, I agree that kids should be exposed to literature and should be aware of the genres and authors that are out there—but only so that they (the students) can choose to pursue it further on their own *when they're ready for it*. For kids who don't plan to be writers, they're not likely to appreciate these things until much later in life.

In fact, that's a common trend. Adults go back and read the literature they hated in high school and say to themselves, "Wow, this really *is* good stuff. Too bad I didn't actually read it when I was in school. *Kids should be required to read this.*" This is a common reflex: You learn to appreciate something as an adult, and you jump to the conclusion that kids should be required to study the thing. The problem is that the reason you didn't appreciate this thing until you became an adult is that *you weren't ready to appreciate it* when you were a kid. Neither are today's kids, so don't force them. Requiring kids to read things that adults appreciate won't turn kids into adults any sooner. (But courses should be made available to students who *are* ready.)

Perhaps the most common theme in reports on education is the conclusion that we compare unfavorably to other countries. How will we compete with China? India? Their kids are so good at math! (For the record, I would like to state that competing with other nations should *not* be our goal in education, but it seems to be what the politicians are obsessed with, and it's popular to compare our performance with that of other countries. But regardless of our motivation, I think we can all agree that we should be trying to improve our system nonetheless.)

Let's assume for the moment that the qualities that will make us more competitive as a nation will also improve our society, economy, etc., in general. Then we can return to the question: What will make us more competitive as a nation, in terms of developing our kids' minds?

A lot of emphasis has historically been placed on math and science above all other subjects. Let's accept that these are important subjects, but let's assume that all other subjects are important as well. We want improvement across the board: stronger math, stronger science, stronger

social studies, stronger philosophy, stronger arts, etc. How do we bring about such improvements? We need to require *all* students to study *more* of each of these subjects, right?

WRONG!

I would argue that the strength of a nation in a particular subject area (physics, for example) has nothing whatsoever to do with the *average* degree of expertise among the *general population*. Requiring *all* kids to study physics actually won't help. On the contrary, our nation's strength in physics depends on the degree of expertise among our *experts*—people who showed an early interest and affinity for physics and pursued it with a passion.

Take for example, the Manhattan project, or the moon race. These were impressive endeavors. The scientists who made these things possible weren't kids who hated math and physics but, thanks to strict government policies, were required to study the subjects anyway. No, they were people like Richard Feynman, who became fascinated with math and science at an early age and, for the most part, ignored other subjects and specialized almost pathologically in his area of expertise.

The advancement of our nation will come about better by letting those who are academically inclined race ahead of the pack—in *their preferred subjects*. Rather than forcing everyone to study years and years of every subject, we should be identifying kids with high aptitude and interest in each subject and spurring them on in that subject. See a kid who's good at math? Let him take more math classes; and without neglecting foundational reading and writing skills, relax the requirements for him in the other subject areas.

I believe that if we help kids find their niche early on, then not only will they flourish more as individuals but *we* will flourish more as a society. People will be happier and they'll be better at what they do. As things are now, most kids with strong backgrounds and the highest potential are held back to the ever-decreasing average. (No Child Left Behind is, in practice, No Child Allowed to Get Ahead.)

You might protest that kids don't know what they want to do early on, and they should be required to learn everything so that, in college or afterward, when it comes time to settle on a career, they have a strong enough background in every subject to choose from among all subjects. A broad background gives you more freedom. I would counter that if someone finds a passion later on in life—after having specialized in something else—if they really want to pursue that passion, their passion will give them the motivation they need to fill in any gaps that might exist in their background.

9) Reward highly motivated students with greater flexibility in their schedules and self-directed study.

Many kids need structure. If you give them control over their own schedules, they'll accomplish very little. They need to be kept on task, and they need direction every step of the way as they work their way through the curriculum. Our current system is tailored for such kids, and they benefit greatly from it. The kids who are highly motivated and capable of directing their own studies, however, are greatly hindered by being confined to a rigid study schedule that keeps them shackled to lower-performing students. They will flourish best if given more freedom.

One problem most students face in the transition from high school to college is the difficulty of learning to manage their own time after years of having every minute managed for them. In high school, kids go from one class to another with barely enough time to go to their lockers. Even within a single class, teachers work hard to have no “down time” between activities. At no point in the day do students have to answer the question, “What should I do next?” or “How should I schedule my time today?”

When these kids get to college, they suddenly find that they have only three hours of class each day. The rest of the day appears to be “free time,” and they treat it as such. This has become a big problem at some colleges, where standards have dropped to accommodate students who don't adjust their study habits to be productive with such a loose schedule. Kids get to college and decide that it's easier than high school. What they don't realize is that they'll get out of college exactly what they put into it. They think that they're doing great in college because everything seems so easy, when in fact they might be getting a pretty crappy education.

What needs to happen is that kids need to start learning how to manage their own time a little bit earlier, and they need to make a gradual transition to the college-type schedule. Throughout high school, students who demonstrate a high degree of self-motivation should be rewarded with control over their own schedules. A kid who's good at math and who's interested in getting ahead ought to be taken out of his regular math class and given a self-directed study period. Such a student will actually be able to move at a faster pace than the class that he's being taken out of.

Of course, these students must be assessed, and they must prove that they've used this time wisely. As long as they are provided with good resources and can get help and guidance from a teacher, they can still be subject to the same sort of assessment (for mastery and retention) discussed above.

Some private high schools have already begun experimenting with college-like schedules and seem to be having success. The key is to ease students into it gradually, and to make sure that kids who benefit from this freedom are receiving it, while kids who would benefit more from the traditional schedule are given a traditional schedule. That's why flexibility would be most effective as a reward for students who are already doing well. This reward also becomes a motivator for students who haven't yet earned the privilege of managing their own time.

10) Do away with the emphasis on “preparing kids for college,” and stop measuring the success of high schools by their acceptance rates into college.

These days, kids (or their parents) are preparing for the college application process earlier and earlier in life. When examining a high school, or even a middle school, the primary question on people's minds is, “What's the college acceptance rate for kids at this school?” The success of a school, a district, and a state is now measured by the percentage of students who get into college. But colleges often suffer from the same shortcomings as the K-12 system. College education itself needs to be reformed, as does the application system.

At each point in the continuum of education, teachers, parents, and academically inclined students are all focused on preparing for the “next

level.” And so elementary schools focus on preparing kids for the skills that they’ll need to get passing grades in middle school; middle schools for high school; and high school for college. But in many ways, even college fails to prepare kids for real professional life. Thus, kids are starting out in the wrong direction from the very beginning.

If we have an appropriate curriculum—including skills that are necessary and practical in real life—this obsession with college applications should become unnecessary. If kids are doing a good job learning the right things, they should not have to spend so much energy making themselves look better than they actually are, padding their résumés with this or that extracurricular activity (often not because of an inherent interest in the activity but because of an awareness that it will help them get into college). They should be able to focus on *learning*.

11) Invest in education—even in other people’s kids’ education.

I think it goes without saying that we lack good teachers in large part because there’s not much financial incentive to become a teacher. H. L. Mencken wrote that “the essential dilemma of education is to be found in the fact that the sort of man (or woman) who knows a given subject sufficiently well to teach it is usually unwilling to do so.” Low salary might not be the only reason for this problem, but it certainly is a significant factor. Furthermore, in addition to being unable to pay teachers well, too many school districts are making do with inadequate facilities and painfully few resources. Although a complex problem can’t be solved simply by throwing money at it, it’s clear that our education system is woefully underfunded.

There are several reasons for this problem. Some people are reluctant to invest in the education system because it’s so broken that, in their view, it’s not worth putting any more tax money into it. Also, many people who are fortunate enough to be able to afford private educations for their children do not want to spend further money in the form of taxes on a system that they don’t even use. Given the cost of private education, this sentiment is certainly understandable; and there’s nothing wrong with the conviction that you should be able to spend *your* money on *your* children.

However, I would like to suggest that an investment in public education is still worthwhile, even for people whose children are not in the public system. First, until there's a better alternative that's available to *everyone*, especially to low-income kids, continued underfunding is only going to make the situation worse. Second, the quality of your own child's future depends significantly not just on how well-educated *she* is, but on how well-educated her millions of *peers* are as well. Those are the people with whom your children will be living and working in the future, and the vast majority of them are in the public education system.

By investing in public education, we will make the world a better place for ourselves and for our children. The way our society works, money from the government isn't enough. Corporations and wealthy individuals must make contributions in order to bring about the kind of improvement that's needed. "Where your treasure is, there your heart will be also." Sadly, our current state of affairs clearly reflects that too few people have a heart for America's children.

12) Develop trade schools.

This suggestion is related to the proposal that students be allowed to specialize early. Some kids just aren't interested in academics, and forcing them to get a high school diploma might serve more to embitter them and keep them removed from opportunities to find beneficial employment than to improve their future prospects. There are kids who are resistant to receiving a traditional academic education and who are likely holding back other kids who *are* interested in studying. Some of these kids make campuses unsafe. This is a tough problem, and I don't claim to have a sure answer, but I have a suggestion that I hope we might at least try.

First, we need to give these kids something to *do*. Give them a break from compulsory academic study, and give them a chance at a different, but equally useful, sort of education. We should start programs—separate schools, perhaps, or traditional trade schools—in which these kids can learn practical skills such as construction, carpentry, plumbing, and various crafts. Give them training, but at the same time give them opportunities to apply their skills in actual *work*. Not forced labor, of course, but subject to the

same regulations on working conditions and pay as regular adult workers. Let them learn what it's like to *work*.

Maybe kids who are allowed to start working at this point will be less likely to get involved in drugs and gangs, if they're able to feel like working adults, contributing members of society with some say. Or maybe they'll realize how tough such lines of work are, and they'll go back to school with a motivation they never would have acquired otherwise. If these students have other viable options besides traditional schools, schools will become better places, for several reasons, and perhaps society in general will benefit greatly.

13) Develop a culture of respect for and value of teachers.

Teachers in our society are not very highly valued. Many of my colleagues had the same experience I had when they broke it to their parents that they wanted to go into teaching. Their parents said, "You can do better than that." In many cultures, teachers are highly honored, even revered. Why not in ours?

In some cultures, a person might gain respect by giving up a fortune to become a scholar. But in *our* culture, the most respected people are the ones who *drop out* of school to make a fortune. We value people based on how much money they make, and we pay people according to how much we value them. Consequently, we're stuck in a vicious feedback loop. When we see how little teachers earn, we assign a low value to teaching as a profession. Then, once the idea that teachers have a relatively low value is ingrained in us, we tend not to want to pay them much. We must put a stop to this cycle.

Plainly and simply, teachers need to be paid more. You might say, "The teachers we have right now aren't effective and don't *deserve* to be paid more." Even if this is true, it's still the case that people who would make much *better* teachers see how little the current teachers are paid and, despite an interest in education, choose a different profession because they have a strong interest in being able to feed their families. One of my best high school teachers left education for a job in industry after just a few years.

I asked him why. His answer said it all: “My wife and I would like to be able to buy a new car.”

We need to recruit teachers with better incentives and to give them more authority and privileges. Part of the reason so few people aspire to become teachers is that there’s a social stigma attached to the profession. People think that teachers only become teachers because they can’t do anything else. But in fact, teachers have to draw from a diverse palette of skills—management, expertise in their subject, performance, and much more.

Considering all the things that teachers do—and I’ll tell you what they do in a minute—they are *very* poorly paid. In economic terms, it could be argued that what you “make” is proportional to your “value” to society. In reality, teachers’ trifling salaries reflect not how little we’re worth, but how screwed up society’s values are. Taylor Mali said it best when he answered the question, “What do you make?” with the elegant response, “I make a difference. What do *you* make?” For his full, poetic response, see the following video on YouTube:

“Taylor Mali on ‘What Teachers Make’”

<http://www.youtube.com/watch?v=RxsOVK4syxU>

I think most people don’t have a clue what teachers really do and what we are required to *be*. When I was a student, I thought teachers were just warm bodies who had possession of the “Teacher’s Manual” for their assigned course, and that they simply projected lessons from this manual onto the board. I knew teachers who had been laid off from their jobs in industry and went into teaching, presumably because they couldn’t do anything else. It’s possible that they couldn’t. But those few examples were horrible teachers, and they were probably less suited for teaching than they were for their industry jobs. People like them perpetuate the misconception that, “People who can, do; and people who can’t, teach.”

So what *are* teachers?

Teachers are **managers**. A typical teacher manages anywhere from 120 to 180 students each year. We manage their behavior and their character development. We manage their organizational systems and their

usage of time. We manage their long-term and short-term goals. We manage a curriculum for every course we teach. (Some teachers teach three or four different *courses*—not classes, but *courses*.) We manage a database of lesson plans, activities, and materials for each course. Most of these we create ourselves, and we continue improving them year after year. We manage budgets and make critical decisions about what materials and software should be purchased for our students. Each course and each student is at least a year-long project.

Teachers are **administrators**. We keep files on most of our students. We write letters and make phone calls to parents, and we keep records of all of our communication. We make policies, refining them each year: policies on classroom behavior and on the grading of class work, homework, quizzes, tests, and projects, among other things.

Teachers are **legislators** and **judges**. We meet with other teachers and make contributions to school policies. We write rules and policies for our own classrooms. We make judgments about disputes between students. We make judgments about late work, makeup assignments, and retakes. We make judgments about cheating and plagiarism. We make judgments about what constitutes an A and what constitutes a B. We pass sentences when students commit infractions. Then we deal incessantly with students and parents who complain about and appeal our decisions. We spend hours of our “preparation” periods meeting with parents, students, and administrators to justify our decisions and deal with students who want an easy grade.

Teachers are **experts** in their subject areas. We need to know our subjects backward and forward so that we can present and explain each topic clearly and lead students from complete ignorance to mastery. We need to be able to answer questions on the fly.

Teachers **work long hours**. My school starts at 7:55 and lets out at 3:35. Those are the hours I’m *paid* for; but they’re not my working hours. In most jobs, if your workday starts at 8:00, that means that at 8:00 you’re walking in the door, hanging up your coat, turning on your computer, pouring yourself a cup of coffee, and getting ready for your day. If you *teach* and your first class starts at 8:00, that means that you have your students

seated and working at 8:00, which means that you were walking in the door at 7:30, rushing to hang up your coat, boot up your computer so that you could get the projector turned on and have your handouts ready before students started walking in the door at 7:40 asking you questions about their homework and the upcoming test. Moreover, it means that you were working late the evening before so that your presentation would be polished (or created from scratch if it's your first year teaching the course), the previous day's homework assignments would be graded and ready to be returned, and photocopies of the next day's handouts were made and sorted. I know teachers who regularly stay up late grading papers on weekends and weekdays.

I've probably left out a lot of things, but these are the main things that teachers do. Unless you're a teacher, you probably never imagined teachers doing most of these things. My point is that teachers deserve respect. Most other jobs—jobs that pay a lot more—are not as demanding.

Changing our culture to develop respect for teachers won't be easy. But people need to realize the following: (1) Teachers are intelligent people who worked hard to become experts in their subject and to become qualified educators (i.e., to develop the skills of management, administration, policy making, etc.); (2) The work of a teacher is difficult and requires a huge range of skills; (3) Teachers care about their students' academic progress and character development; (4) Teachers work hard, and they work long hours.

14) Stop rewarding students for bad behavior, and implement effective discipline measures.

Two punishments that are often highly ineffective in the way they're carried out are suspension and detention. Suspension too often ends up being a reward for students. They see a three-day suspension as a three-day vacation. Not only that, but to many students, a suspension is a badge of honor. There's a "welcome to the club; you're cool now" message that older students send to younger ones who have just received their first suspension. It's cool to be a rebel, and the number of suspensions you've had is a quantification of this degree of coolness. I see kids come out of the principal's office smugly telling their friends, "I got suspended!" and then exchanging high-fives.

Not only is suspension a reward for the students, but it's often a punishment for their teachers. Did one of your students miss a test because he was suspended? Now you have to schedule a make-up. Oh, and he's found out from all his friends what the test questions were, so either you have to take the time to write a new test—just for this one trouble-maker—or you have to accept that he'll have an unfair advantage over his better-behaved classmates.

What about detention? If kids have to sit in the library and do their homework during detention, it's not punishment at all. I've seen kids decide that getting detention one day a week is a good way to make sure they have a set time to do their homework in peace.

When did our society get so screwed up as to be horrified at the thought of unpleasant discipline measures? Nowadays, whenever someone proposes something that might be a genuinely effective punishment, there's a chorus of voices saying, "No, we can't make the students do that! It would hurt their feelings," or some such nonsense. I'm sorry, but I thought punishment was supposed to *deter* kids from committing the same infraction again, not coddle them and apologize for the faults of society that led them against their will into patterns of destructive behavior.

The kids who are getting into fights, vandalizing school property, and skipping class shouldn't be sent home on vacation. They need to be kept in school longer, and they need to be doing tasks that are unpleasant and useful. Schools need to hire drill sergeants, professional football players, and pro wrestlers who can smell shit a mile away and won't take it from anyone. These guys (and gals) need to be well paid for staying late after school and cracking the whip (so to speak) over kids while they pick up trash around the school grounds, wipe off the cafeteria tables, mop floors, and clean the bathrooms. Let the janitor supervise the kids while *they* clean the school rather than mop up their messes for them.

I hear protests. "You can't make kids clean toilets. That's unsanitary!"

Well, so what?

My mother made me clean our bathroom at home every Saturday morning when I was little, and I'm glad she did. Was it sanitary? No. Should

she be hauled away for child abuse? No. What did I learn by cleaning my bathroom? I learned to be careful not to drop globs of toothpaste around the sink when brushing my teeth. I learned to be careful not to splash water on the mirror. I learned to make sure that all of my trash went *into* the trashcan and didn't just fall on the floor behind it. In short, I developed a sense of ownership over that bathroom space. It became mine. And most importantly, as a result, I began to take *responsibility* for that space. I respected it, I kept it clean, and I developed good habits that I'm thankful I still have today.

That's exactly what students in school need. They need a sense of responsibility for the cafeteria floor and tables; the bathroom walls and stall dividers; the desk surfaces in classrooms; the sidewalks and green areas around the school. As things stand now, no one respects school property and school grounds, and that's because they don't feel any ownership or responsibility for it, which they *would* feel if they were the ones who had to keep it clean.

Make students do these things, and when their punishment is over, they'll be *glad* to be back in class. They'll stop looking for another way to get out of class by breaking the rules. Plus, when they see other kids trashing the bathroom that they just cleaned, they'll say, "Don't f*** with my toilets." (And then when they get caught fighting over this, they'll be put on the next cleaning crew.)

Maybe it's unsanitary. But that kid who spit his gum into the urinal without an ounce of empathy for the janitorial staff—who never did *anything* to him except clean up daily and uncomplainingly after him—has, as far as I'm concerned, forfeited his right to be sheltered from the hazards of cleaning a bathroom. The kid who stuffed a whole roll of toilet paper into the commode? The kid who used his key to scratch the word "fuck" into the bathroom mirror? The kids who spray-painted the walls, wrote on the desks with permanent markers, threw their trash on the school grounds? Kids treat their school like a dump because it doesn't belong to them.

Well, let's change that. Students need to be told, "That toilet is *yours*. Clean it. That floor is yours. Mop it. That desk is yours. Scrape the gum off the bottom and clean the writing off of it." Can't make the kids get the spray paint off the brick wall outside? Why not? Don't trust them with a

sandblaster? Of course not. Make them use sand*paper* until the last spot of paint is gone.

The problems I'm addressing here go far beyond schools. Many of our communities and work environments are abysmal because many of us don't see them as ours. We don't respect the space, and we don't respect our neighbors. It's probably because we never learned to take responsibility for our environment. Making kids take responsibility for the school grounds will actually build character. But suspension? I'm not sure what it accomplishes.

Having said all of that, keeping the school clean should be everyone's responsibility *all* the time. It shouldn't just be a punishment. Every student should serve a tour of duty at some point in cleaning the cafeteria, the bathrooms, the hallways, the classrooms, etc. Maybe that should be one of the mandatory practical classes, right alongside computer skills: Cleaning Skills. Kids need to learn how to use a mop, a sponge, a broom, and a dustpan; and they need to understand that these skills aren't beneath them. But let's save the dirtiest tasks for the kids who would otherwise be getting suspensions or detentions.

Pessimistic Note of Caution (A Challenge in Disguise)

On a pessimistic note, the likelihood that a genuine overhaul will actually be carried out on the scale that's needed to make any real progress in significantly changing our system for the better seems dismally small, for several reasons.

First, our education system exists in an environment that disallows significant change. While many people are calling for significant change, those who have the means to implement change—from federal and state politicians to school board members to ordinary voting citizens—disagree on the kind of change that is necessary. A change that is thought to be beneficial by one person will be thought harmful by another. As a result, the only change that will ever survive a vote (whether in congress or a school board or a popular election) is one that has been pared down to the lowest

common denominator of what the majority can agree on; but such changes are often so minor as to be practically impotent.

One might suppose that the needed change could be brought about through a series of small alterations. This might be possible if education were in the hands of a group of likeminded people who shared a common vision for what the system ought to become and were able to formulate and adhere to a long-term, step-by-step plan for reaching the end goal. But unfortunately, our system is not in the hands of such a group; and even if it were, the situation wouldn't last long enough for the goal to be realized, because politicians get voted in and out of office, board members are replaced by people with different ideas, and popular opinion changes rather quickly. As a result, although a good long-term plan might be *initiated*, it will likely be scrapped as soon as the political climate changes.

Richard Dawkins (of all people) provides an interesting analogy to aviation with a meditation on the transition from the propeller engine to the jet engine. Obviously, the jet engine is superior to the propeller engine (if you want to fly fast). And while the two engines have certain elements in common, their overall structures and the principles on which they operate are so drastically different that a jet engine cannot be created by applying a series of minor improvements to the propeller engine.* To create a jet engine, one might utilize certain pieces of knowledge gleaned from the operation of a propeller engine, but ultimately one has to start from scratch and design the jet engine from the bottom up with a new end-product in mind.

(*Actually, it *might* be possible, but the end product would be an awfully strange jet engine with a whole lot of inefficient, vestigial hardware. This doesn't hurt our analogy because we don't want our school system to have inefficient, vestigial hardware either.)

Our current education system is the propeller engine. We wish to develop a jet engine version of education. The point is that we can't turn our current system into a jet engine by making small, beneficial modifications one at a time. We would have to start from scratch. But of course, as I said, our education system exists in an environment that will prevent it from being remade from scratch.

A second source of resistance to overhauling the system is psychological. Before an overhaul can be carried out, the majority of people must first admit that an overhaul is necessary. To do so is to admit that the existing system provides children with substandard education. Since we ourselves are products of this system, the implication is that *we* received a poor education. But who wants to admit that they're poorly educated?

People are more inclined to think, "This is the system I went through. These are the things I had to learn, and they worked for me. Today's kids need to do the same." I myself have thought this way, and I've encountered a lot of other people who think this way as well. Often it's not even conscious; it's just natural. At some point, though, we need to admit that we are, in many ways, poorly educated, and we need to get to work on overhauling the system so that our children *won't* be.

A third reason that no significant positive change will come about is that people are selfish and short-sighted. Selfishness is a problem because those who have access to quality education resources and effective schooling for their children will tend to monopolize their resources. An overhaul that's beneficial to most might be harmful—at least temporarily—to some (those who are already in a pretty good situation), and those people to whom it would be harmful tend to be wealthy and powerful and to have the means to prevent any changes that would hurt them.

Perhaps more importantly, the sort of overhaul we need would take a while to prove effective. It might take decades to see the benefits. In the meantime, kids might be even worse off in the early stages while the kinks are worked out. They might *not* be worse off—but who's willing to offer their children as guinea pigs for a new system?

In order to improve your financial status, you need to make some kind of investment—a short-term sacrifice for the sake of potential long-term gain. If you quit your job and go back to school, sacrificing a \$30,000 salary and taking on some debt, you'll decide it's worth it in the end if you get a \$60,000 salary and pay off your debt in two years. Still, it might take four or five years for you to end up in a better financial position than you were in to begin with.

Improving our education system will require a significant investment, a short-term sacrifice for the sake of long-term gain. Our politicians and the voting public seem unable to swallow short-term sacrifice. For too many people in our culture, anything less than “your way, right away” is unacceptable.

A fourth reason is that people are apathetic or feel powerless. Once most people are done with their own education, they don’t want to have anything to do with education again. Once you finish college, you get a job and start a new life without looking back. You have enough problems to worry about: keeping your job, maintaining your marriage, raising your kids, staying healthy, finding meaning in life. Education is a distant cause for which you have little interest and no time.

The people who might care the most—students—don’t yet have the perspective to say how the system can be overhauled for the better. (I don’t want to dismiss their ideas, but I do emphasize that once you’ve graduated from an education system yourself *and* gone back and worked in the education system *and* formally studied the subject of education *and* examined systems elsewhere in the world, you have a stronger basis for recommending changes.) And even if they did, they’re not yet in positions of authority where they can make the changes that need to be made.

This pessimistic note of caution is, of course, really a challenge.

Most people nowadays espouse an educational philosophy according to which it is necessary to protect children’s delicate senses of self esteem at all times. Of course, this philosophy emerged with good intentions as a reaction to a real problem that sometimes (and in the past, perhaps often) occurred: namely, that children would be told directly that they were no good or that they would be punished severely after trying hard and coming up with a wrong answer, an experience from which they would learn that it’s best not to try hard again because they would risk being disgraced again. But equally of course, the new extreme to which we have taken this reactionary philosophy is rubbish. This might seem like a tangent, but I actually have a point here, so bear with me.

My point is that, *sometimes*, certain kids are actually best motivated when they are told point-blank that they'll never amount to anything and they don't have a snowball's chance in hell of solving a particular problem. The kids for whom this works are, of course, kids with a somewhat defiant nature. Tell them they can't do something, and they'll try all the harder to prove that they *can*, in fact, do it. Often, it's kids with such a nature who have the best chance of reaching the highest level of success. And so it is to such people that I am writing.

I'm telling you right now that the kind of change I'm proposing can't be accomplished. And I'm telling you this because I know you'll then want to go out and give your best to prove me wrong. In which case, I will have succeeded and you will have succeeded, and the whole country—perhaps the whole world—will be better off. So I'm telling you now, most emphatically, that you can't change anything in this world, and there's no point even trying. So stop reading this now, and just get on with your life, enjoying it as best you can despite all the world's problems.

The Purpose of Education

If we're serious about reforming the education system, we need to take a serious look at what it is exactly that we're trying to do. What *is* an education, and what should students gain from going through our education system that they would not otherwise gain? What should be the mission statement of Education?

Here are some candidates for the purpose of education that have been suggested by scholars in the past:

- To achieve fulfillment of the whole natural human potential.
- To enable individuals to reach their full potential as human beings.

Well, these things sound nice, but if they're to be of any use, we absolutely need to define what we mean by "potential" and what it means to reach one's full potential. Once we've done that, we can look at the system

we've got and determine whether it's helping us—as an entire society or as individuals—to reach this “potential.”

The above suggested purposes, as stated, could be interpreted two ways. First, on an individual level: that each *individual* reach his full human potential. Second, at the level of society as a whole (within a particular country, or whatever the basic social unit is that creates a single education system): that the *community* be brought to fulfill its full human potential as a functioning society. It is interesting to consider both cases.

Practically speaking, one might argue that if all of the individuals are fulfilling their potential, then the society surely is fulfilling its potential. This depends, of course, on one's definition of “full potential”; but suffice it to say that there may be reasons why most, if not all, individuals might need to give up certain aspects of their potential for the good of the social group. There's no need to go into detailed analysis, but it is important to note that, while individual achievement is important, society as a whole must be stable and (at least somewhat) prosperous in order to be healthy, and this can't happen if *everyone* fulfills her potential to become president of the United States.

In any case, both of these stated purposes for education hinge on the definition of “full human potential.” So what is fulfilled human potential on an individual level? Maximum financial income? Maximum refinement of one's talents, such as skill on a musical instrument or capability within one's profession? Must one fulfill his potential in every subject area?

Everyone must specialize at some point, but at the same time, educators today generally believe that students ought to master a certain body of knowledge and skills in each of the major subject areas: science, math, language, social studies, and the arts. The issue at the heart of the matter comes to light when one considers the two different extremes of specialization and generalization.

In the first, each individual specializes early on and to the extent that the individual learns nothing at all about any subject outside of his specialty. In this case, of course, the fear might be that people won't be able to function, or “fit in,” if they're so isolated in their knowledge that they can't relate their expertise to other fields and the rest of society in general.

In the other extreme, everyone learns as much as they can in every subject area. The result is a person whose knowledge base is vast in scope but cripplingly shallow. Such a person wouldn't be able to solve any complicated problems within a specific area. If everyone were like this, innovation and problem solving just wouldn't happen.

Clearly, then, the goal should be to find the optimum in between these two extremes: Just how much knowledge beyond one's specialty is ideal? Perhaps it depends on what one ends up doing as a profession, but at least in the beginning, when a profession hasn't yet been selected, one's education must be broad enough to leave all doors open.

Let's assume, then, that there is some optimum between these two extremes, and that when this optimum is found for each member of society, the potential of both the individual and the community is being fulfilled. This principle alone isn't enough to give us a specific, well-defined purpose. Let's consider some other candidate purposes.

In a democracy, many would say that the purpose of education is and ought to be to produce informed voters who are capable of electing leaders that will further the prosperity and power of our nation. My opinion is that this is, to some extent, rubbish. Yes, a certain degree of education is necessary for people to make good political decisions. However, history has shown time and again that well-educated masses can still vote for abysmal policies. (As a side note, I think America has passed the education threshold that is necessary for a democracy to function as intended. However, there are other barriers to further improvement that stem more from the system itself than from the people's level of education, and until those barriers are overcome, we're stuck at a highly dissatisfactory level of functionality.) All of this is secondary to my primary argument, though. Even if we just want to create informed voters, we might still be dissatisfied with our education system.

Another candidate for the purpose of education might be to provide people with the skills they need in order to get jobs and survive in our capitalist society. There may be something to this, but there are at least two reasons why, in practice, this is not the de facto purpose of education. First, observe that our current curriculum includes a host of topics that are not

directly applicable in the vast majority of professions. Second, if the purpose were to prepare workers, then why not specialize early and teach each student only the skills necessary for their planned profession? Why not just have trade schools? And finally, consider who designs the curriculum. When policy makers ask the question, “What do our kids need to know?” they turn to the “experts” for the answer: university professors with PhD’s in the subjects in question. The problem with this is that a university professor’s idea of “essential topics” within her subject is very different from the set of topics that will actually be useful to a typical employee at a company. Thus, the curriculum is *not* designed with employment in mind, and this suggests that, in practice at least, education is not aimed directly at preparing people for the work force (though you could certainly argue that education *should* do this).

A third candidate for the purpose of education is to generate enough smart people to give our country a competitive edge over other countries. This cold-war-era brand of thinking is what gave us a huge arsenal of horrifyingly effective nuclear weapons and an American flag on the moon. Unfortunately, if we are at all concerned for the well-being of humanity and our planet, we must conclude that this view is worse than rubbish. The time has come for us to focus our efforts on finding ways to live and work *together* peacefully and to develop our societies and economies without using up or polluting the air, water, vegetation, etc., that sustain us. (As I have said in a previous section, the best way to compete with another country is to encourage specialization and let the people who are passionate about a particular subject pursue that subject single-mindedly—yes, even to the exclusion of nearly all else.)

A fourth possible purpose: To enrich people’s lives. In addition to having university professors decide what’s “essential,” we also have the phenomenon of adults looking back with regret on what they didn’t learn well when they were in school. For example, one adult might read *The Scarlet Letter* and, after having experienced infidelity and much else related to the themes of the book, feel overwhelmed by the depth of the novel. Reaction: “Everyone needs to read this. It should therefore be taught in high school.” This is well-intended, but it should not be the primary focus of education. People will enrich their own lives when they’re ready to

appreciate such things; but their lives won't be enriched by reading such things when they're not ready for them.

A fifth candidate: To mold people into positive contributors to society. This is similar to the goal of creating educated voters, but here contributions to society go far beyond the way people vote. This is tied more to morality (or ethics, if you prefer) and socialization than academic knowledge, though certain aspects of history, such as the holocaust and Civil Rights movement are essential in educating people about how to get along with other ethnic groups.

There are, perhaps, many other potential purposes for education, but the real purpose is likely to be a mixture of these things. Students *do* learn skills that they will need in their future professions, though this is clearly not the main thrust of schooling. Students *are* enriched by exposure to literature, music, etc., but once again, this is not the primary focus. Policy makers have historically been driven by an effort to get our students to a level that can compete with other countries, though again this is not the primary focus.

There is another possible purpose I haven't mentioned yet, which I have concluded to be the primary *de facto* purpose, though most people probably wouldn't initially think that it *ought to be* the purpose of education. This purpose is *to assign a numerical value to the quality of each student's mind so that institutions of higher education and corporations can select their members intelligently*. The current educational institution has evolved in a competitive environment, and hence it has developed mechanisms that separate the more competitive members from the less competitive. With this purpose in place, the *content* that students are taught almost doesn't matter at all. We can be teaching kids utter garbage, as long as we're testing them on the garbage in a way that allows us to rank them in terms of scholastic aptitude.

If you're like me, your reaction to the idea that the purpose of education is to quantify students' value is likely one of denial or horror. Keep in mind that I'm not at all saying that this is what the purpose *should* be. Rather, this is the function that education has taken on over the years. From kindergarten, kids are assigned grades. They're ranked and sorted. Kids with higher grades get into the "better" schools. This process continues all the

way through college. Finally, kids with the most impressive GPA's and transcripts get the best jobs. From beginning to end, the education system serves to assign value and rank students.

Should this be the purpose? If not, what *should* it be?

To some extent, this function of ranking people is necessary. We want to make sure that the people who excise brain tumors or watch over our nation's nuclear arsenal are hard-working, competent people. There are certainly other mechanisms besides school grading systems involved in weeding out those who are not suitable for such jobs. But the grading system is the only filter that's applied from kindergarten and has long-lasting effects on kids' lives.

Personally, I would *like* the purpose to lean more toward the function of molding people into positive contributors to society who will make the world a better place. For the good of humanity, we need to put large-scale competition behind us and replace it with cooperation. The world has enough problems, and we need compassionate, cooperative, unselfish people if we're to overcome any of them.

If this is to be the purpose of education, we must decide precisely what qualities make a person a "positive contributor to society," and we must decide how one would go about developing these qualities in a student. To be sure, stuffing kids' heads with knowledge isn't sufficient. Neither is simply ranking students and tossing them into a competitive corporate world.

How do we create an education system that will instill children with good values and empower them to make positive contributions to American society and to the world as a whole? This is the trillion dollar question, and one which I won't presume to answer.