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EDUCATION IS FOR THE STUDENTS' FUTURE

(Draft)

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The problems of education are still on us. The public wants something done now, so we can get back to other pressing matters. Professionals say "The schools are improving; the test scores show a little upturn. The worst is over." District boards of education and politicians are calling for stronger superintendents and principals, who will "not let them get away with it." And state departments of education are warning schools to "Raise those scores, or we will have to take over."

In the center of all this chaos lie the students and teachers. They are getting the real blame; yet they are powerless to do anything about it. The increasing pressures force them into routines (drill and practice, mostly) that have been there the whole century (see Cuban, 3), and the resulting rote learning is making impossible the meaningful learning of skills, let alone using them outside the school.

The real tragedy is that the result is increasing anxiety and desperation on the part of the students, resulting in increased dropping out, delinquency, drugs, crime and suicide. The long-range problem of shifting the whole process is basic; but the immediate need is to lessen the pressures and allow (and aid) the schools to change their ways. There is increasing desire and understanding which can get the process started, if we can only help rather than attack them. But the negative forces are strong and on high levels. It is essential that we make concerted efforts to get communication and cooperation towards a truce so understanding and reform can take place. This is the reason for my writing these lines.

The continued failure is proof that we are missing something basic. It is clear that we must apply real problem solving, decision making, to make a valid upturn. The whole situation is very complex, with many features of varied sorts playing important roles. We cannot expect to change the workings of such a situation for the better without a deep understanding of the whole dynamics lying underneath; so we have to find the features of most importance, choose basic and workable goals, and use those goals to check on what we are doing. Only in this way can we make either immediate improvement or long-

range success; so I am asking us to get at this job, along with any other activities we feel pressed to do.

We know that rote learning is useless for applications; we know that pressures and mass testing holds teachers down to teaching by rote; and we know that, in spite of our struggles, nothing has changed. But also, we have no real faith in children's being "able to think" (I speak especially of we who study them in the classroom), and we are just too busy to give the needed attention to this massive ferment; so we let it go. But what we can do is make it a *basic commitment*, and aid others in the task.

If the working goals contain the most essential elements, that will be sufficient to keep us on a good track. So I consider first where we want young adults to be, and then the schooling needed to help them get there.

Basic goal for the future: Adults will have the power and commitment to help mankind towards keeping us and the planet as a well functioning whole.

There are several parts to this, from the deep to the outwardly clear.

(1) The commitment involves a real sense of responsibility. This is moral, spiritual, ethical, rather than intellectual.

(2) We need a deep understanding of the world and society in all its complex interrelations; this must allow us to carry out sane decision making.

(3) Power of reasoning is used to sort out and comprehend our complex world.

(4) The actual knowledge is at the basis of the understanding and decision making.

Schooling is a process, so we state its goals in terms of the process.

Basic goal for education: Students will be aided in growing toward the above goals.

Growing is integrating oneself in all one's functions, essentially through one's life experiences. As an adult, there will be no teacher to watch over you; you have to control everything you do. So *experiencing* such activities, controlled by you, is a fundamental part of your learning.

We look more at the individual goals. Responsibility and commitment cannot be taught. They come from experiencing and appreciating the common good when you have worked toward that end. For instance (from Glenn and Warner, 5) at breakfast on the farm, all the extended family there, the three-year old is admonished: "how do you expect us to do our work when you have not brought in the eggs which nourish us?" The child senses the warm and nourishing tone behind this, and is moved inside to greater commitment.

Decision making is an intellectual conclusion; in difficult situations it must be based on both your careful thinking and on your deeper life experiences. (How to bring these experiences to your attention has been studied by Gendlin 4.) It is particularly the humanities, including history, which are the source of growth in this area in school and college. But outside experiences may be still more important.

Goal 3 will be served in part by all school work, especially through discussion, and partly by one's continued need for growth and control. And goal 4 is essentially on factual content (and easily describable processes); it is this part which is tested on the usual standardized tests, hence concentrated on by teachers.

Note that language skills, and communication more generally, is a basic part of the above. So discussions should be, in part, about such communication.

Are all students inherently capable of such goals? As preschoolers, they certainly grew in all ways, learning complicated and subtle things like communication, faster than they ever will again; and all without formal teaching. Like all animals, they lose none of these capabilities while growing. So their apparent loss in school is due to our pressures, not to them. The fact that there are essentially no "disadvantaged" children is shown for example by Benezet's experiences; see (1). Those of us who have worked carefully with children in difficulties are in general well aware of this.

We are now at the basic part of our work, to pick out the essential features of schooling and see what can be done about them to work toward the goals. So let us look at that clear issue, rote learning. First of all, what sort of thing is learning? Has it degrees of intellect? I see four distinct levels:

Level 0. You do as you are supposed to, mechanically, without thought. Drill goes directly to this. It is though you were becoming the hardware of a computer.

Level 1. Like level 0, except that you must do some *translating* from words to task. Thus this is like software.

Level 2. A situation is described, from which you must pick out the particular task required. This is like being a computer operator. It is like our usual solving of life's little problems, without trying to push into new directions.

Level 3. The situation is complex, perhaps with subtleties; you attempt to find meanings, questions, and come up with answers that may contain breakthroughs. This is like being a designer of computers.

A final level would consist of creative inspirations, leading to new points of view.

The difference between the first two levels is shown by the National Assessment (NAEP) questions: Do $21 + 54$ (written in vertical form), correctly answered by 90 percent of the 9-year olds, and "What is the sum of 21 and 54?", with 69 percent correct. Apparently, the children were well drilled in the simplest addition; but when mere translating "sum" into the command (these were difficult children), they could not be "software," having been trained to be "hardware."

This makes evident also the difficulty in trying to teach children problem solving: Teaching it turns it into a lower level; but in real life it is not on that level (and the teacher is not there for you).

Is the US falling behind other nations? We certainly mean this question on a high level of thinking. Yet the "international comparisons" are carried out mostly through standardized tests, which are almost completely on the lowest levels. These tests may as well be disregarded. They tell us about schooling, not about high thinking.

What is rote learning in school, and why does it happen? We mostly believe that in school math, the children are simply learning what you should do on given tasks, for instance in two-digit subtraction, without trying to get the meaning behind it. I find reality quite different. The children are mostly trying to put down *correct marks for that day*, not correct answers to *questions* (or tasks). They don't look at the questions; they guess at what sort of marks (numbers) to put down.

I have described in (10) how children are confounded by changing rules for subtraction, given a *pattern* (as they see it) of four digits making a square box. And this is typical of their attitudes which are formed early and never change (until college perhaps): Learn the rules of that day. And guess what to do; meanings don't count.

But then how can they be sure of correct answers in *using* arithmetic outside school? Of course, they don't try; they know very well that school math is for school, not for the outside. (compare Carraher et al., (2).)

Let us look at the attitude about "math" of the textbook writers, the testers, and probably the teacher trainers; for these of necessity become the attitudes of the teachers.

For them, math is a set of skills and subskills, with right ways to do everything. The students are supposed to *see relations* among skills, which make it easier to remember them; but for them, under "rules for the day" the complexities merely get all mixed up with each other, so they can only guess what to do.

The general professional attitude is: "know all the skills; in a particular case see which skill is needed." This is similar to the attitude of mathematicians, directed at students: "Learn more math; you will need it later." It is *experience in mathematical reasoning* in various situations that is needed; the bare mathematical facts can be learned *through* that reasoning, and on the job.

The basic difference can be seen through levels of thought: Level 0 (and 1) learning is almost useless; it can only help speed you up. It is level 2 that can be practiced routinely; with level 3 to challenge students and get them used to carrying out their work, especially through explorations, organizing, and the like.

Thus the math *curriculum*, in terms of topics to be taught, misses the students; and the *instructional methods* should certainly not be a bare presenting of material.

I believe I am expressing what has been the normal attitude about math among professionals, and among those trying to make immediate improvement in schools. But I also see an increasing move toward deeper understanding, leading to the view I am presenting here. I have certainly seen a far greater commitment to true learning in the last year or two than I could have expected before that time, so I have real hopes for basic improvement.

We all want very much to help others, and try to do it through advising them. But this *tells* them what we think they should do, reducing them to level 0 or 1: do what you should. And we really do not want that to happen. So we must also realize the difficulties of school teachers shifting from presentation of material to helping the students start exploring situations. (And of course it applies on the college level also.)

I now look at the problem of getting real improvement started. The *fundamental* problem is that of getting *changed attitudes*.

On the one hand, it is easy. Chatting with a student who "can't think," if I speak of things I am interested in, say going shopping, the student is likely to think of similar

things also and shortly she or he is doing real mathematical thinking.

The teacher attitude "they cannot" (place value, long division, percent, whatever) is very strong. For one example, a group of six teachers (in Brazil) said "It is impossible to teach long division!" (with a one-digit divisor). After some discussion, I "paid them for writing that article together": Plain popsicle sticks were ones, reds were tens, blues were hundreds, those two yellows were thousands. "Why don't you share it?" Then remained passive. In time, they decided to use the money bag, and exchanged a yellow for ten blues (tied together with a rubber band). Soon the sharing was accomplished, with some ones left over. I then asked them to repeat, a bit structured (big money first), and record. Looking at the recording and seeing the algorithm, they exclaimed "Now I know that *my children can!*" They knew their children could carry out that experience as well as they did. In () I describe how to continue this process to a solidity in the topic, which many say should be thrown out of the teaching schedule (of course it should not be *taught*).

Turning to these students again, what might we look for in them to show real progress being made? Of course the first thing is, they must *be there*. This means, not just in body but in spirit also. There is no way to grow toward the goals without this. So let us walk into a typical classroom and look at the students. We know from Goodlad (6) (and from our own experience) that we are most apt to see boredom, passivity, lethargy; they are half alive. We would not choose any of these students to come and help us. So the *climate* of classrooms is basic; *involvement* of the students in *real study* is absolutely essential, for at least a good part of their time and energy.

And how can we get involvement? Is it there automatically with a good climate? Unfortunately, no; the students, having had those poor attitudes for years, have *no experience with involvement*. "So we have to motivate them!" We let them play games, getting points for right answers. This is blowing on that bit of spark inside, hoping a flame will be lit. But such a spark will burn out at once without inner nourishment. The *spark of life* must be *nourished from inside*. And this comes from inner involvement, that preschool type of curiosity and desire for exploration, that must be revived. And just as attitudes can jump forward, then go forward later more easily, the same is true for the spark of life, the true involvement.

Finally, I look more directly at what we can do. On the local level, this involves communication and cooperation with the groups in school, so we work together. We

are just beginning to see cooperation among the education groups involved; compare Meier and Shanker. Helping get such cooperation started can work wonders.

On the higher level, for instance with state boards of education, getting into real communication may be difficult. But it is extremely important, because of the power exercised over the schools. Getting in touch, to get a real level of communication, may not be easy. They do not understand, seem not to hear what we say, and vice versa. *Continued contact*, finding some bits of topics with similar interests, can lead to better communication. I find my attitude of acceptance and respect for anyone I am with to allow closer communication rapidly; but continuing may still be hard.

In a group of a few people, desiring to get into the heart of matters, there are some simple principles that help. Making short, carefully thought out, statements, and then *pausing*, promotes real listening and consideration. The others *and* you gain from this. Neither pushing nor pulling may help; but accepting the *process* underway and looking for a time to continue it, is likely to at least give a few people happy to go further.

I have said a lot without being able to hear responses, so I stop here. After more contacts, I expect to write further, and I hope better still. In particular, I am starting a series of exploration topics which can be played with (without help, as far as possible); these, in part, combine science with math. And a particular purpose is to have them used in groups, which will help with language skills and communication in general.

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