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ABSTRACT

Proliferation of factual data, an educational pro m for some time, is a greater dilemma today due to the knowledge explosion. Facts are accumulating at an alarming rate: All too often teachers require students to learn irrelevant data (statement of facts) rather than learning to select, process, handle, interpret, employ, and organize data, and to develop skills. General education should have the relevant goal of teaching skills, capacities, and insights which are applicable to solving problems and to the transfer of learning in general. Reasons given for substituting the learning of raw data in place of skills in most courses are that students shift from subject to subject leaving little time to learn more than definitions and factual data; that simple assertions of data are predictable, allowing for objective examination by teachers, for students to prepare for examinations, and for an average coverage of subject. The quantitative increase in facts, subjects, ideas, and in publications requires an increase in the human capacity to absorb and process, and less on information, data-like statements, and "knowledge" in the most common sense of that term (more properly put, a distinction between knowledge of items and knowledge of skills). (SJM)

THE PERVERSION OF EDUCATION INTO DATA TRANSMISSION

The Communications Overload in the Modern Educational System

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The world is and always has been full of bits of raw fact, raw data. The purpose of education should be to enable us better to process, handle, interpret, employ, organize, and select from the innumerable bits of raw data which surround us. The tendency of the schooling system, often, is just exactly the contrary; schooling very frequently degrades significant ideas, conceptions, skills, statements of capacity, into what are in effect raw data. In the hands of those who understand and can utilize them, scientific formulae, of course, provide a capacity for doing or achieving or interpreting far superior to common sense. But a high proportion of students who "pass" scientific courses appear to learn the formulae as pure reports, which they are unable to use. Similarly, in the study of, for instance, sociology, a good deal of time and effort is often spent in learning terms, vocabularies, which if employed as intended by those who invented them would permit us to see social relationships more clearly. But the hardest thing, I used to find, in the days when I taught sociology was to get students away from learning the definitions as isolated statements of fact. Few of them wanted to master a

new way of looking at the social world.

Now, there is an excellent reason, at least in our kind of world, why teachers and students connive with each other to substitute the learning of raw data, for the learning of skills, capacities, and perspectives. In the first place, of course, it is perfectly obvious that in order to discuss any subject or problem meaningfully, there are relevant raw data which need to be learned. Since we shift students, particularly in colleges, from three units of this to three units of something else, often unrelated so far as they can see, the emphasis tends to be in each new so-called "subject" on the raw data, demanded by that subject. Indeed, I think I now see one of the important emphases in general education as compared with the so-called specialized or nongeneral education as lying precisely here: the generalist learns skills, capacities, and insights which have a continuing or at least a recurring application to many problems, not dealt with in a given class. The type of the subject does not <u>necessarily</u> matter very much, as far as I can see, as to whether the education is or is not general; some students of chemical engineering learn, some teachers of chemical engineering teach it, in such a way as to make it significantly general, whereas some teachers of philosophy (in fact a great many of them) teach philosophy either as a set of assertions which are to be learned as raw data (or at best as highly trivial capacities). I would add that certain subjects are, by their tradition, somewhat harder to teach as general

education than others--for a number of years, my own major research interest was in state government, but none of the normal texts or course outlines permit anything general (45 lt govs, etc.--charts). But ultimately as I taught it I was able to teach the field as a branch of organization and general systems theory, of some permanent value, I believe, to my better students. Similarly, such purely descriptive subjects as political history, history of literature, and as it used to be taught in medical schools, anatomy, are likely to be particularly non-general. But all of them can be redeemed. (Contrast with fertilizer story).

The tragedy is that in the nature of mutual convenience many courses are taught and most courses are learned as sets of raw data. This is why as Postman & Weingartner point out, it is generally assumed that once you have covered a subject, you can forget it. But they--and other critics of contemporary education really do not tackle the issue as to <u>why</u> courses usually degrade themselves into raw data--and many students with conscientious, serious teachers insist on trying to tackle and degrade what the latter deal with as raw data. Basically, it appears to be a matter of predicability; most people naturally enough want to be able to receive a definite return, a measured return, on investment of time and energy,--or at least not to fail to receive a minimum return. This, as the great sociologist, George Homans, has shown seems to be a characteristic of social relations. So,

the student likes to feel--insists in many cases on feeling---that the whole schooling process is predictable. Now, once one has acquired the one skill of learning raw data, and has acquired a minimum logical and composition ability, one can make courses predictable. You get out, in most cases, roughly the amount of return which the energy put in allows you to calculate. From the teacher's standpoint this is a lot easier, too; you can examine students on bits of raw data, and they either do or don't do well. You don't have to worry about being regarded as unfair or capricious; you can show that they got 56% right and 44% wrong or whatever it may be. Everything is balanced.

As a matter of fact, a great many teachers who talk a wonderful game, who are genuinely in love with skills and ideas, examine and grade in this fashion. (Example gen. semanticist, examined on what the texts say).

To make perfectly clear what I mean by raw data herein, I am referring of course formally to statements. I include herein as raw data statements of ideology; a teacher who examines students on his own ideologies, so that they can and do mark right those statements of ideology which he regards as right or vice versa is testing on a raw data type statement.

Students, in general, are willing to tolerate an awful lot of what they regard as dross, meaningless irrelevancies about ideas, insights, etc., from teachers, if the teachers in the grading and examining process follow the rules of the game, as here suggested, making things predictable.

Now, one of the very important reasons why there is a pressure to place emphasis on learning a whole set of facts is the drive by teacher and often administration to "cover" a subject, in a term, or year. By way of parallel, no sane teacher of calisthenics or tennis would, I hope, insist on going ahead to complicated things, until students had mastered the elementary skills---nor would he skip in each lesson to a new set of activities, without being sure that students had actually demonstrated competence at the skills previously introduced. But in the sciences and humanities, we do just this; we start out with that idea, then go on in a week to this idea, etc. A course which covers the text in a semester or a year almost drives both students and teachers into examination on remembering what has been said, rather than into permitting the demonstration of skills and capacities. (As a matter of fact some physical education courses do indeed examine people on what they are supposed to do, verbally, without any effort to see if they can do it---describing what the book says about how to swim, but not seeing if the student can swim).

If we want to teach students to think, process, organize, select, understand, we simply must give up the notion that we cover any given subject or text; and if we are teaching teachers, we must make equally clear that the notion of <u>average coverage</u> is an absurd one.

This was brought home to me most evidently in this connection; in 1948, I taught in a general social science course at Hobart College, where we devoted nine semester hours to a series of books

and ideas, for students, the majority of whom planned to major in social sciences or the humanities. In 1966, I taught in the same course (since its director had moved to Massachusetts Institute of Technology) at M.I.T.--theoretically the same course, but, every year, almost, some book had been added, and very few books withdrawn--the course was six hours, and most of the students were pre-engineering. The result was that most of the students in 66 prepared vehemently by memorizing the very difficult books they read as far as they could and the staff had largely given up on the effort to follow through on skill acquisition by individual students, whereas in 48 some students really learned.

This little experience calls attention to the shift in college and high school education from mere tragedy to outright catastrophe. It has always been tragic that so much time and effort has been devoted to learning simple assertions of fact. But, until recently, there was fairly general agreement on a fairly limited set of facts as being THE important ones for a given group of students to learn. Now, we are faced as teachers and as students, with an increase--a many fold increase--in the number of facts, the number of subjects, the number of ideas, which are presented to us as important. The publications explosion, the knowledge explosion, etc., etc., mean that there is more and more to be learned--if we take seriously the notion that learning consists of getting more and more facts of significance in our heads. In each field--in political science or biochemistry or whatever it may be--there are more and more

facts of significance in our heads. In each field--in political science or biochemistry or whatever it may be--there are more and more significant books about which serious scholars feel serious students should know. Look at the announcements in your own field, whatever it may be, of important books this year--look at the number of journals in your field, and compare it with the books, journals, etc., available in 1946. In many fields of knowledge, 90% of all published work has appeared since World War II.

There has been no corresponding increase in the capacity of the human organism to absorb, process, interpret, and understand information. I am making a distinction here, between basic statements having the character of raw data and information, by the way (explain)--derived from H. A. Simon's basic work on this topic (first published in Greenberger).

For the human organism--whether teacher or student--can attend to only a relatively few matters at once. It can, of course, be exposed to an indefinite number of matters--I could just now have (if I wanted to go to the bother) cited all sorts of impressive figures to show what the communications explosion means in the modern world, but you would not have been any wiser, nor would I, because all we really need to know here is that the increase has been vast and beyond comprehension. I would have looked up the figures merely to impress you, not because they helped. Or I can teach a course in, say, 19th century English literature

where I ask students to read 25 novelists and poets in a term--the likelihood that (if also taking other courses) most of these novelists and poets will mean much to them is slight indeed. Similarly, most courses in political philosophy skip from X to Y to Z to K to Q, so kids, students, learn an assertion about this, a point about that. (My own experience has been different: why... Bluehm has shown, to be sure, one method of improving this 60 some degree, but he leaves out, etc...)

Herbert Simon in one of his seminal articles shows us what the information explosion means. An information-rich world is a world in which there is a scarcity of what----? A scarcity of course of attention. Because, for historic reasons, we focus with pride on the numerous BITS of information which are available out there, we do not pay attention to the lack of ability to attend meaningfully to most of these bits of information. It is simply impossible for any student in any field to know--that is to grasp meaningfully--most of the significant bits of information which are available to him.

In one way or another, a meaningful education, a meaningful adaptation to the modern world, must teach us to protect ourselves from the enormous quantities of information which are available to us. I want to place the stress there upon "teach us to protect ourselves." Most of us intuitively have learned methods of coping with information overload; we ignore this and pay attention to that. But, for most of us, these techniques are

unconscious, unplanned, unthought out, and may not be the best ones. One technique, of course, which most students use is, if what I have already said is correct, very undesirable; they eliminate from serious consideration information about techniques of processing and organizing information, in favor of examinable statements of a raw data character.

We live in a world which is, that is, ATTENTION-POOR to a quite extraordinary degree. It is, of course, desirable to increase our own and our students capacity to pay attention--we can perhaps do this, depending on the student, to some extent, but available information about the human nervous system suggests that there is no hope of increasing that capacity nearly as rapidly as the information richness of our environment makes desirable. Humans can at best increase their attention-absorption, to use a figure of speech, as humans can increase their speed at running---but attention keeps expanding to the speed of space ships. Another parallel may suggest what technology has done for us in communications; we have a great deal of technical power, which is wonderful, but technological power means a scarcity of such ecological values as clean air and clean water. So, comunications technology means a scarcity of capacity to grasp relevant information, to handle and process all we hear. (I am not here chiefly concerned with another serious aspect of the matter; but as a practical issue we are preparing students to live in a world where such already familiar devices as photocopying and such new

inventions as cable television mean that they are competitive ever more ruthlessly ~~to have~~ to select a small amount of available information to attend to and reject all the rest; for various reasons, there is every reason to suppose that Cable TV type information will be more attractive to specific audiences than academic information as now packaged).