

Quality in Education According to the Teachings of Deming and Feuerstein

Myron Tribus
Fremont, CA

Introduction

While there have been many contributors to the theories of management and of education, two names stand out for both the boldness of their departures from past thinking and the comprehensiveness of their approaches.

Dr. W. Edwards Deming (1900-1993) and Dr. Reuven Feuerstein (1921-) have each pioneered new ways to think and to act, the one in management and the other in education. Together they provide a new way to approach teaching and learning.

Some educators may not see the connection between management and education. That is because the teachings of Deming and Feuerstein involve a drastic change in paradigm. One of the inescapable features of a paradigm shift is that in the beginning, those who are learning of the new paradigm interpret it in terms of the paradigm they are to leave. This difficulty is inevitable. My purpose in writing is to make the transitions at the personal level and organizational levels easier.

Dr. Feuerstein has concentrated his attention on how children learn. He builds on the work of Piaget, but goes much further. For about a half century he has developed his system for the improvement of learning and is guiding its adoption in many countries around the world. If teachers adopt the Feuerstein approach, they will change in dramatic ways the way schools operate. As a result, the way schools are managed will also change.

W. Edwards Deming, in over a half century of teaching and lecturing, has influenced managerial practices all over the World. His book, "Out of the Crisis" has been translated into many languages. The Deming Prize in Japan is given to companies which show excellence in the application of his ideas. Companies in Japan and elsewhere now compete for this prestigious prize. If the work of Feuerstein is to succeed, it is essential that educators also understand the work of Deming. What goes on in the classroom is constrained by what goes on in administration; and vice-versa.

By sampling educational and managerial practices in several countries, I have concluded that the ideas of W. Edwards Deming and Reuven Feuerstein are still unknown to most administrators and teachers. What these pioneers have to teach us is of the utmost importance. The growth of world populations, the depletion of natural resources, the degradation of the environment, the demands for a higher standard of living by an increasing number of people, the spread of information by satellites, the creation of a world wide economic system (in which money travels at the speed of light) and the proliferation of weapons of mass destruction... these forces have produced an era of rapid change. The depth and complexity of this era of change have been described by Drucker¹ in an insightful and thought provoking essay, "The Age of Social Transformation." Drucker argues that we are in the midst of the most extreme societal changes in recorded history. These changes now challenge our abilities to *manage* our institutions and to *learn*, collectively. We need to learn how to adapt to new and ever changing conditions.

Deming's View of a System

W. Edwards Deming often advised that an enterprise be viewed "as a system". Activities need to be examined "in context". The sketch he drew to illustrate his meaning is taken from page 4 of *Out of the Crisis*.²

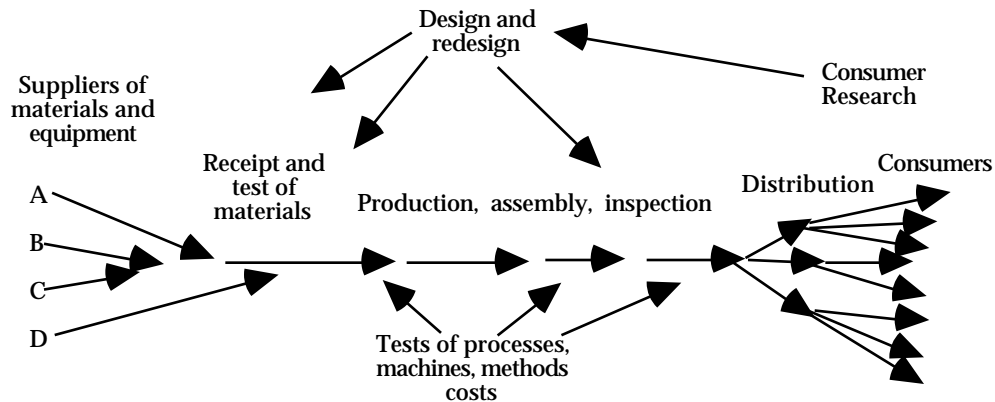


Figure 1. Deming's definition of "the enterprise as a system".

At first Deming's systems concepts were considered only in connection with manufacturing systems. Then they were extended to include services.

Now they are applied to all manner of systems, including hospitals and schools.

¹ Drucker, Peter F. "The Age of Social Transformation" *The Atlantic Monthly*, November 1994, page 53.

² Deming, W. Edwards, *Out of the Crisis*, MIT Press, CAES, Cambridge, Mass., 1982

Elaine Torres, who has been actively applying Dr. Deming's system concept to education, developed the elaboration of figure 1, shown figure 2.

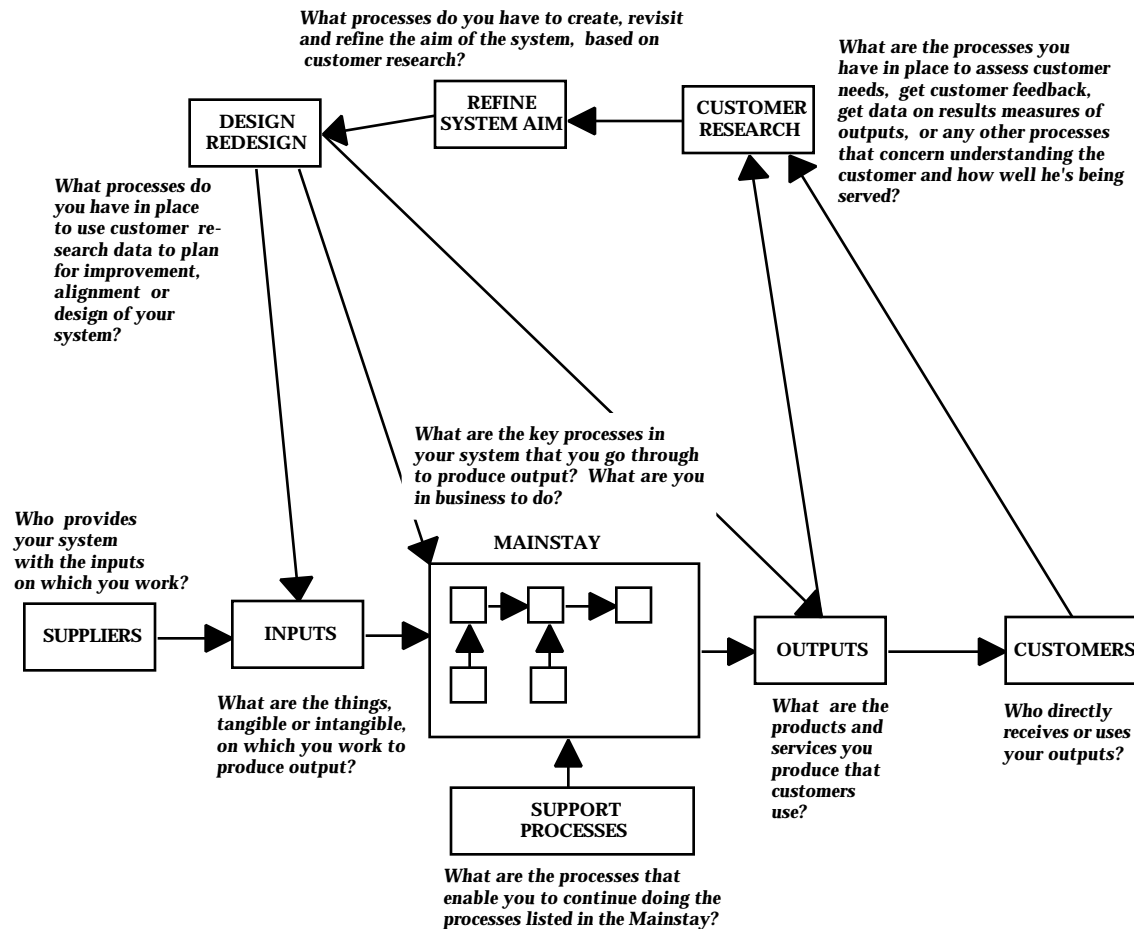


Figure 2. Elaboration of Deming's Diagram by Elaine Torres³

Using Elaine Torres diagram, I have constructed my own version to depict the typical school in America. Figure 3 does not represent any one particular school, it is an impression I have of many.

³ Elaine Torres, Partners in Profound Knowledge, 11551 Forest Central Drive, Suite #129A, Dallas TX 75243 Ph: 214 503 7735 FAX: 214 503 7736 (Private communication)

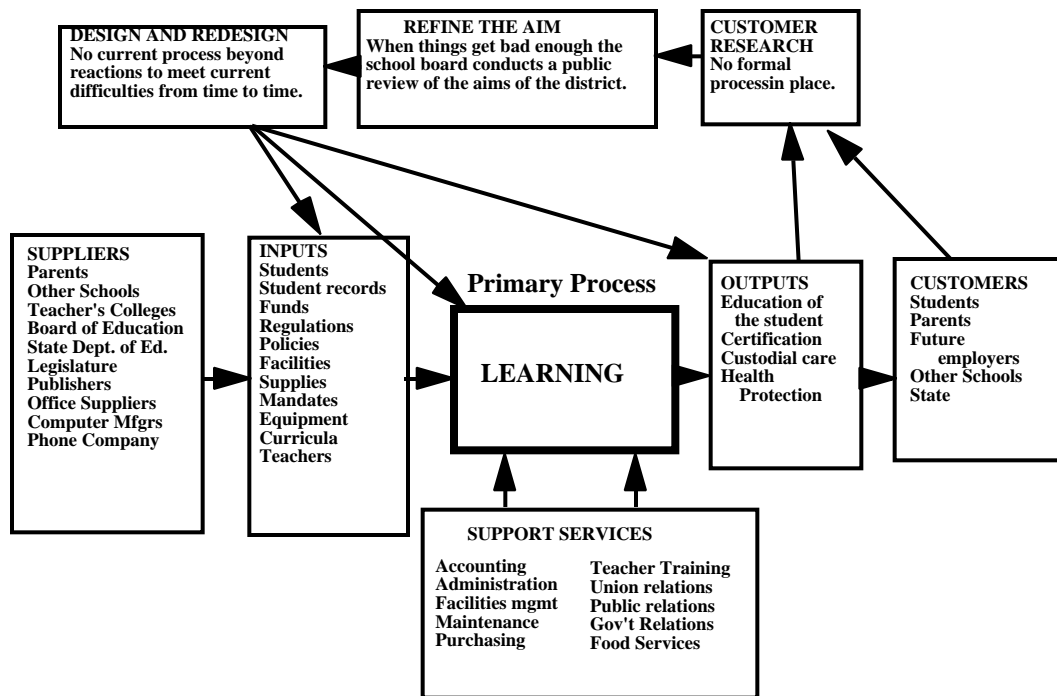


Figure 3. Torres diagram applied to a school system.

When I talk to an administrator and ask, "How do things get done around here?" the administrator is apt to show me an organizational chart and point to the different boxes, explaining what the people assigned to those boxes are supposed to do. Until Dr. Deming began to popularize his little diagram, managers concentrated their attention on the *organization*, not on *how the work gets done*.

Deming changed the understanding of what it means to be a manager. Beliefs about what managers do developed over centuries. The new view is captured in a definition of the manager's duties:

**The people work IN a system.
The job of a manager is to work ON the system,
To improve it,
Continuously
WITH their help.**

According to this definition, the roles and responsibilities of those who manage and those who do the work are drastically changed. The implications are many.

The job of a teacher should also be redefined along the same lines.

**The Students learn IN a system.
The Teacher's job is work ON the system,
To improve it, continuously,
WITH their help.**

In industry most managers did not know how to describe, define or improve a system. The system concept was not part of their education. Likewise, teachers have not been taught to think about a "learning system".

We suffer a great deal from imprecise vocabularies. The English language is very rich, but it is often ambiguous. The word "system" is used in everyday language in three different ways:

The weatherman on TV refers to the "weather system" and draws our attention to satellite photos of clouds covering portions of the Earth.

Sometimes we use the word "system" to describe a "method", as for example "I have a system for beating the stock market."

The sense in which I use it here is as a way of describing a set of interacting processes. When a student learns, the student becomes involved with a number of processes, many of which involve other human beings. The processes involve the receiving of assignments, the identification of data and other inputs, the use of various devices, ranging from desks and pencils to computers, telephones and libraries. Taken together, these various processes combine to produce systems for learning. It is the teacher's job to improve these systems, but teachers seldom know what is actually happening in most of these processes. Only the students know. In a conventional classroom, students have no possibility to inform the teacher. Improvement can only come if teacher and student work together to identify and make improvements. Unless the approach to administration makes change possible, it will not happen.

Making change possible means more than making teachers responsible. They must become response-able, which means much more attention to teacher training and development than is now the norm.

The paradigm shift is so profound that many managers and teachers are unable to make it, much to the detriment of their companies and their students. In other publications I have listed some of the differences between the old and new paradigms of management⁴.

⁴ See for example, papers in Quality First, a compilation of essays on quality management distributed by the National Society of Professional Engineers, Publication #1459, PO. Box 96163, Washington DC 20090-6163. Phone (703) 684 2800 FAX: (703) 836 4875

Feuerstein and the New Paradigm of Learning

Figure 3 shows *learning* as the central process of a school. Before I studied the works of Reuven Feuerstein, I would have put *teaching/learning* as the central process. Now I know better.

My colleague, David Langford, illustrates the difference between teaching and learning in a little story. He says, "You know, last Wednesday I taught my dog to whistle. I really did. I taught him to whistle. It was hard work. I really went at it very hard. But I taught him to whistle. Of course, he didn't learn, but I taught."

Just as Deming introduced a new paradigm for management, so has Feuerstein introduced a new paradigm for learning.

Figure 4 illustrates what I have chosen to call the "Skinnerian Scheme of Learning".

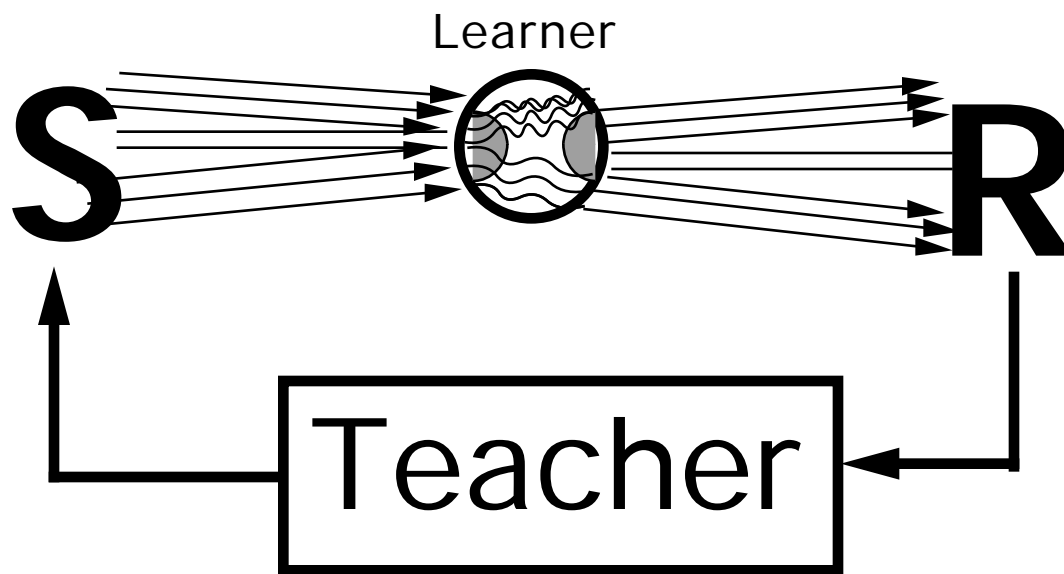


Figure 4. The "Skinnerian Scheme" of Education

In this system the teacher puts various stimuli before the learner. The learner receives the stimuli (signals, assignments, demands, orders), decides what to do, and makes a response. The teacher examines the response and decides what stimulus to use next.

The teacher has a well defined idea regarding what the learner is to supposed to learn. It is as though the student's head is a vessel to be filled by the teacher. The teacher's objective is to see that the student "gets it" and that the information is properly in place.



Figure 5. The student is often treated as an empty vessel into which knowledge must be poured.

Different teachers have different methods, but almost all consist of two general interwoven strategies:

1. Provide materials to be learned and examine the responses for evidence of learning.
2. Manipulate the reward system, i.e., adjust punishments and rewards, to get the information "in".

This approach is buttressed by national schemes for testing. When teachers are forced to teach to the test, students get bored and genuine education ceases, no matter what the test scores may say.

The teachers (or managers) not only use this paradigm but along with it they form opinions about the learners. Depending upon how appropriate the teacher finds the response, the teacher will classify the students as "bright" or "dumb". This classification system has been given a patina of scientific respectability by the development of IQ tests. Thirty five years of experience in education convinces me that Feuerstein is right in saying that the invention of the IQ test has been one of the most damaging developments in the history of child psychology. I have always been distrustful of IQ tests. Now that I have read the works of Feuerstein, I know what my intuition has been trying to tell me was right.

Feuerstein's view is shown in the following diagram, adapted from one of

his publications.

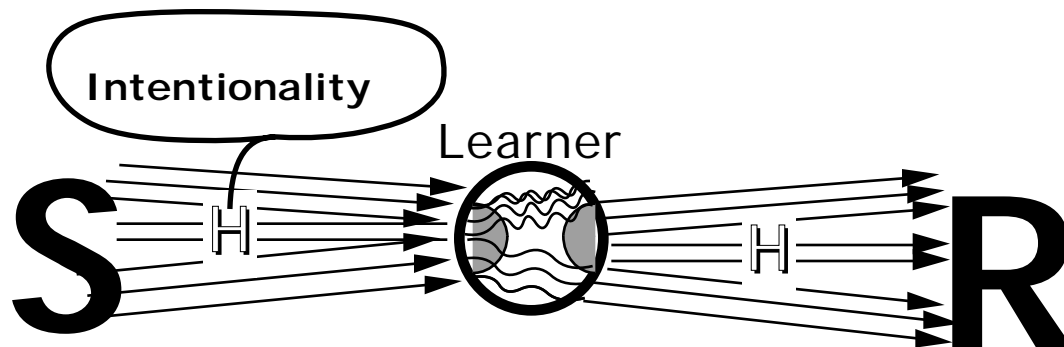


Figure 6. The Feuerstein Paradigm

In the Feuerstein approach the teacher is replaced by a *mediator*, whose task is to help the learner learn. The task is *not* aimed at placing a specified body of knowledge into the learner's head. The mediator is represented in the figure by the letter "H", to indicate that mediation is done by a warm human being who works with the learner in such a way that both of them discover how the learner learns and how to improve the learner's learning process.

The mediator's intention is NOT to help the learner to solve the problem posed by the stimulus. It is rather to understand, with the learner, the *process* whereby the learner learns. The stimulus, in the form of a test, has been designed to make it possible for the two of them to investigate this process.⁵

The learner is involved in a three step learning process. In the first step the learner receives the stimulus which has been especially designed to make it possible for the learner and mediator to gain insights into the learning process. In the second stage the learner processes the information. In the third stage the learner decides upon a response, and is also assisted by the mediator. Feuerstein describes this three step process as a "Mediated Learning Experience".

The designs of the tasks are the distinguishing features of the Feuerstein approach. They are not designed to teach a specific knowledge or a special skill. Rather they are designed to help both the mediator and the learner discover what is happening during the learning process. They are joined in an attempt to learn *how the learner learns*. and to *improve the process*. For example, one of the tests consists of a series of simple objects which the

⁵ When an innovator introduces a new paradigm, it is often necessary to describe a concept not required in the older paradigm. Feuerstein invented the word "intentionality" to make it clear how mediation is different from teaching.

learner is supposed to draw. These might be a square containing a triangle, a circle, perhaps a star. The figures are simple. The sample may be at the top of the page and the learner is asked to draw a similar figure, only larger, at the bottom of the page. The mediator observes the way the learner tackles this problem. Does the learner have a plan? Does he or she check the work as it develops? The mediator may ask the learner to change the color of the pencil, at different stages of the process, which will make it possible, later, for the two of them to discern the order in which the parts of the task were undertaken.

With simple drawings, the learner has no difficulty. But as the complexity of the drawing increases, even though the individual objects to be drawn are simple, the number of them and their relation to one another makes the task complex⁶. It requires more and more attention on the part of the learner. To a trained mediator, the processes which the learner uses become apparent, and more importantly, the difficulties the learner is having become apparent to the learner too. Together they develop and test strategies for improvement.

The teacher is NOT testing the student. The teacher and student are, together, evaluating the learner's learning process. They are seeking ways to improve it. Armed with a catalog of common errors and how to correct them, the mediator will suggest to the learner a modification in the process. Together they examine the strategies of the learner and the learner will be advised to try a different strategy. *Together* they will consider if the improvement occurred.

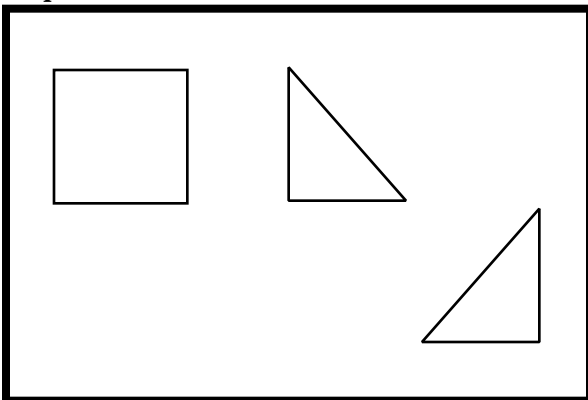


Figure 7. The sample. The challenge is on the next page.

Let me give you an example from my own experience. The first time I saw a teacher applying Feuerstein's method with a class of fourth grade children, I took a copy of their assignment as my own challenge. In the case at hand,

⁶ The same challenge arises in computer programming. Each command statement may be simple, but a program containing 10,000 commands is, by any measure, complex.

the children were asked to find a square and two triangles in the pattern of dots shown in figures 7 and 8 . Figure 7 is the sample. Figure 8, deliberately placed on the next page, is the challenge.

When the children were working on their assignment, I spoke out from the audience in a loud voice: "I am having trouble finding the square. Can one of you help me?" A little girl, whom I judged to be about 9 or 10 years old came over to me.

"What is your problem?"

"I cannot seem to find the square."

"Well, look for a short while at the square at the top of the page. Now when you have it fixed in your mind, look again at the dots."

In this little illustration she was acting as my mediator. She had learned some of the common pitfalls into which learners may stumble. She understood the inability some people have in keeping in mind the essence of a problem when in the midst of solving it. ("Now let me see, what was I doing?")

I was intrigued by her evident knowledge. So I asked, "Tell me, what do you really learn by playing around with these dots?"

Her reply was swift and to the point: "Well, for one thing, I have learned to overcome my impulsivity."

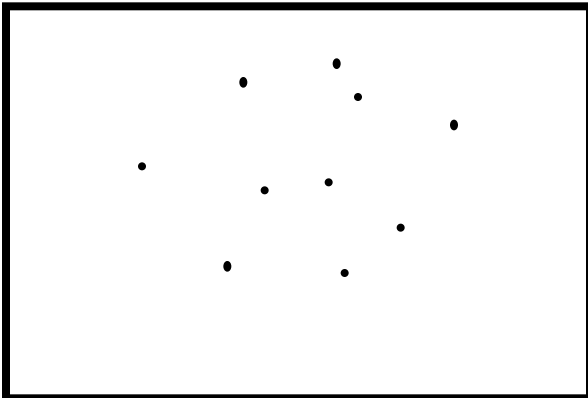


Figure 8. The challenge: Find the square and the two triangles in the dot pattern.

Then ask yourself the following questions:

- a. How did I do it? What did I look for first?

- b. If you did not see the triangles at first, what did you do? Were you conscious of what you were doing?
- c. Did you have to try more than one method? Do you recall which methods worked and which did not?

Feuerstein's methods have been developed in approximately a half century of experimentation, much of it on young people who have been considered as "learning disabled". This population included children who survived the death camps of the Holocaust, the Ethiopian children who came to Israel and had to adjust to at least two centuries of culture change and children who suffered from physical ailments, such as Down's Syndrome, spinabifida, autism and head injuries. The improvements he produced in these children have been hailed as nothing short of miraculous. There have also been experiments made with "normal" children and the results have also been very positive.⁷ Furthermore, when mediated learning was tried with a group of physicists at Los Alamos, who were certainly not "learning disabled", they agreed that the Mediated Learning Experience (MLE) had helped them. Meir Ben-Hur is now working with companies to improve the learning of quality improvement teams.

People who believe in an IQ test believe that there exists, in each person, a *genetic endowment*, which sets a limit on their ability to think and to reason. Feuerstein, however, has demonstrated that people are "modifiable". In spite of the dramatic evidence Feuerstein has provided, the faith of IQ proponents in the immutability of intelligence is unshaken.⁸ By taking people who, according to the IQ test are near hopeless, and getting them to excel, Feuerstein provides data for the contrary hypothesis: People can learn to learn, and when they do, they can excel.

Still, many teachers believe that the IQ exists and is immutable. Therefore, they will not seek to modify the learner. Instead, they will modify their approach to education and will seek to grade, i.e., classify, the students and to serve each with "appropriate" stimuli. The "upper half" will be given exciting and challenging experiences; the "lower half" will be served with boredom. They will leave school and join gangs where they will find challenges of their own devising. On the street they display their cleverness. Ask the police, they will tell you.

This sorting process begins at Kindergarten and continues throughout life, a

⁷ Meir Ben-Hur, editor, On Feuerstein's Instrumental Enrichment: A collection IRI/Skylight Publishing, Inc., Palatine, IL 1994 (800 348 4474)

⁸ As these notes are being prepared a new book has been released, The Bell Curve, which accepts the IQ as a genuine measure of intelligence. It will be a grave misfortune for the future of mankind if many people believe in it.

process Deming has strongly condemned.⁹ Quoting Deming:

These forces cause humiliation, fear, self-defense, competition for gold star, high grade, high rating on the job. They lead anyone to play to win, not for fun. They crush out joy in learning, joy on the job, innovation. Extrinsic motivation (complete resignation to external pressures) gradually replaces intrinsic motivation, self-esteem, dignity.

Cataloging Common Difficulties of Learners

Feuerstein has developed an assessment method which he calls the "Learning Potential Assessment Device" (LPAD). It is a series of tasks designed to identify those aspects of learning in which the learner is prepared to improve. Using the LPAD, the mediator assess the difficulties of the learner. Based on the results, the mediator and learner then devise strategies for improvement.

The LPAD is Feuerstein's version of continuous process improvement. According to the Feuerstein approach, a sharp distinction is made between learning a particular subject, such as mathematics or a foreign language, and *learning how to learn*. The current practice of "Skinnerian Teaching" does not help the student to improve as a learner. The current lack of a distinction between learning a subject and learning to learn guarantees the destruction of curiosity and creativity. Students who, for one reason or another, have not learned to learn, will do their best to figure out how to satisfy the teacher and, if they cannot, they will flee the educational scene.

Fuerstein has developed a list of eight common difficulties learners have during the "input" phase. Although the list was developed over many years of working with children who were branded as "handicapped", "slow learners" or "learning disabled", I recognize in the list difficulties I have often had myself. For example, when I try my hand at computer programming I often feel helpless and confused by the complexity. Yet I see others who are able to write massive programs with very few errors, all the while knowing what they are doing. Over the years I have concluded that they have developed a certain discipline which I lack, but which I am confident I could acquire.

⁹ W. Edwards Deming, The New Economics for Industry, Government, Education Center for Advanced Engineering Study, MIT, Cambridge, See, for example, figure 10, on page 125.

Table 1
Potential Difficulties of Learners during the "input" phase

- | |
|--|
| <ol style="list-style-type: none"> 1. Blurred and sweeping perception. 2. Unplanned, impulsive, and unsystematic exploratory behavior. 3. Lack of, or impaired receptive verbal tools that affect discrimination, (e.g., objects, events, and relationships are not appropriately labeled). 4. Lack of, or impaired spatial orientation and lack of stable system of reference by which to establish topological and Euclidian organization of space. 5. Lack of, or impaired temporal concepts. 6. Lack of, or impaired conservation of constancy. 7. Lack of, or a deficient need for precision and accuracy in data gathering. 8. Lack of capacity for considering two or more sources of information at once. This is reflected in dealing with data in a piecemeal fashion rather than as a unit of facts that are organized. |
|--|

In the second phase, which Feuerstein calls the Elaboration Phase, Feuerstein discusses factors which impede the efficient use of available data and existing clues. These include:

Table 2
Potential Difficulties at the Information Processing Stage

- | |
|---|
| <ol style="list-style-type: none"> 1. Inadequacy in the perception of the existence of a problem and its definition. 2. Inability to select relevant as opposed to irrelevant cues in defining a problem. 3. Lack of spontaneous comparative behavior or the limitation of its application by an inhibited need system. 4. Narrowness of the mental field. 5. EPISODIC GRASP OF REALITY 6. Lack of need for the establishment of relationships. 7. Lack of need for and/or exercise of summative behavior. 8. Lack of, or impaired need for pursuing logical evidence. 9. Lack of, or impaired ability to use inferential or hypothetical (if) thinking. 10. Lack of, or impaired ability to use planning behavior. 11. Non-elaboration of certain categories because the verbal concepts are not part of the individual verbal inventory on a receptive level, or because they are not mobilized at the expressive level. |
|---|

Finally, at the level of generating an output or a response, Feuerstein lists these areas of difficulty:

Table 3
Potential Difficulties of Learners at the Response Phase

1. Ego-centric communication modality
2. Blocking
3. Trial and error responses
4. Lack of, or impaired verbal or other tools for adequately communicating elaborated responses.
5. Lack of, or impaired need for precision and accuracy in the communication of one's responses.
6. Deficiency of visual transport.
7. Impulsive, random, unplanned behavior.

Most of us have seen these difficulties in ourselves as well as others. The question arises, when someone exhibits one or more of these difficulties, what is to be done? Feuerstein's solution, "Instrumental Enrichment."

Instrumental Enrichment

Feuerstein concentrates attention on helping the learner identify and then overcome the specific kinds of difficulties enumerated in the previous section. By "enrichment" he means an activity which occurs in addition to the normal school work.

At first teachers and administrators are apt to consider this enrichment to be an overload. The same concern was once expressed with regard to taking time for continuous improvement in the factory. "If we are so busy now, when are we going to find time to improve?" When improvement teams were introduced, however, it was found that the time spent on improvement was more than saved in improved effectiveness in doing the work.

The evidence is that the three to five hours per week spent in "enrichment" are more than paid back through increased speed and quality of learning in subject matter courses. Enrichment is not concerned with the teaching of any particular subject matter. In fact, the assignments given to the students are deliberately chosen to be as devoid of subject matter as possible. This seems paradoxical to teachers as well. "If you aren't teaching anything, then what are you doing?" The answer is, "We are not teaching. The students are learning how to learn. We are mediating the learning experiences of the learners."

Instrumental Enrichment in Practice

Natalie Broderick and Gail Provost are two teachers/researchers at the public school system in Taunton, Massachusetts, where instrumental enrichment is provided for all students in grades four to twelve. The students participate

in three 45 minute sessions per week. A form, somewhat like the one shown below, is used to develop a "learner profile", which is used *with the student*, to plan for improvement.

INTENTIONALITY



Little thought or effort towards tasks

Intense attention

IMPULSIVITY



Disordered, random response to stimuli

Considers all information then responds

PLANNING



Poorly planned, random, trial and error approaches

Discusses strategies for problem solving

COMMUNICATION (AUDITORY)



(VISUAL)

non-specific language, does not clarify for the listener

Uses clear, precise language and asserts if listener comprehension

MEMORY (AUDITORY)



(VISUAL)

Unable to perceive speaker's intonation

Clear perception of speaker's intonation

Unable to remember what is heard

Remembers auditory inputs

Unable to remember what is seen

Remembers visual input

COMPETENCE



Feelings of incompetence, inadequacy

Feelings of competence, confidence

RECIPROCITY



Does not ask for help or clarify for what is needed

Asks personal questions to clarify learning objectives

The above forms are used by the student and mediator to chart progress. In addition, a form is developed by the mediator to track the effectiveness of various measures taken with each student. The following extract from the form used by a mediator gives the flavor of the mediation.

Name: _____ Date _____ Teacher: _____
 CLASSROOM MEDIATION RECORD

DEFICIT FUNCTION	MEDIATION ATTEMPT	RESULTS
LACK OF INTENTIONALITY	MEDIATION TO DEVELOP INTENTIONALITY	
Appears unmotivated	Focus child on "What do you see here?"	
Does not begin tasks	Focus child on first step	
Overly dependent on teacher for assistance	Use FOCUS sheet for intentionality	
Lacks sense of value of task	Provide bridging to other experience	
Blocking from Anxiety	Use LPAD _____ Use IE exercise _____ Use mediated adaptation of _____	

Similar forms are developed for dealing with impulsivity, lack of planning, egocentric communication, lack of competence and lack of reciprocity.

This example of a technique developed by Dr. Feuerstein is but one of many and is part of the extensive training required for mediators.

Synergy Between the Deming and Feuerstein Contributions.

Deming and Feuerstein never met. I doubt that Deming ever heard of Feuerstein, but if he had, I know he would have shared my enthusiasm. When I mentioned Deming to Feuerstein, he indicated an interest but said he had not yet had time to study Deming's work.

There are remarkable similarities in what the two men have taught. To begin, both men recognized that if you want a better product, you have to work on improving the *process that produces the product*. If it is a product of manufacture, then you must devote time and develop formal procedures to improve the *process of manufacture*. If you want a better education, you must improve the *learning process*.

In quality management, quality circles are organized. Improvement teams are chartered. Feuerstein's analogous contribution is the Instrumental Enrichment Session, featuring Mediated Learning Experiences.

Deming always emphasized that inspection at the end of the line does no good. Sorting the good from the bad does not improve efficiency. It does not affect the process itself. It encourages wasteful habits.

Feuerstein takes the same view towards examinations. In Feuerstein's words, "The only legitimate reason for an examination is so that the teacher and learner can figure out what to do next." The examination as a test of the past is of no value for increased learning ability. Like all external motivators, it can produce a short term effect, but examinations for the purpose of grading the past do not hook a student on learning for life.

Both men have spoken, vigorously, against grades, ranking and especially IQ tests. They damage workers and learners alike, often for life. They take away the potential joy of work and learning. Worst of all, IQ tests project onto the worker and the learner the bad practices which are built into well institutionalized managerial and teaching practices.

There are similarities between the observations Feuerstein has made regarding difficulties which learners have to overcome, and dysfunctional behavior of some quality improvement teams. Look again at the list of common difficulties Feuerstein has found in learners and compare them with the recommended procedures for quality improvement teams as they try to solve problems.

Feuerstein's vision of what a mediator does for a learner is essentially the same as the contribution we expect a facilitator to make to the running of the meetings of an improvement team. The training of a facilitator and a mediator have much in common.

The Human Dimension

When it comes to understanding the importance of self esteem, internal motivators, and the need that people have to be recognized for their personal contributions, Deming and Feuerstein obviously are reading off the same sheet. Their concentrations have been different, however. Deming has looked at *system* and the impact the ways systems are managed have on human behavior. He has cataloged managerial behaviors which destroy people.

Deming was concerned with the whole. Feuerstein, however, while quite aware of the system as a whole, has focused his attention on the *learning process*.

It is as though both men had the big picture. Deming concentrated on how all the pieces fitted (or did not fit) and Feuerstein has concentrated on learning, as the key element, without which there is no picture.

Questions of Substance and Style

Thus far this essay has been concerned with how to teach, not what to teach. The decisions concerning *what to teach* are as important as *how to teach*. If you are a conscientious planner you will find yourself wrestling with the question: Should I teach the subjects I was taught, and if I do, will the students be as handicapped as I in contending with the world of change? And, if I do not, how are they to build on the accumulated knowledge of mankind?

This dilemma was analyzed by Reuven Feuerstein and Mildred B. Hoffman¹⁰ who concluded the conflict can be resolved by changing *the way we approach the teaching of whatever material we believe to be useful in the near term*. I have spent over half my life in fruitless meetings aimed at designing an *improved curriculum*. It is not possible. What is possible is to approach every subject as a process of discovery and as an opportunity to become better at *learning*. . In addition to the three R's, we need to add a third, Reasoning and a fourth skill, Improvement.

Veteran teachers will probably welcome my conclusion: Curriculum planning, except when required for professional education, leading to licensure, is a waste of time.

How Might Deming's and Feuerstein's Contributions be Joined? What Would a School and District Look Like If They Were Joined?

In the school devoted to quality, I visualize that when the teachings of Deming and Feuerstein are combined and we shall see the following:

1. All students are given instrumental enrichment, to help them to become more effective learners.
2. All students, faculty and administrators, are taught the methods of quality management problem solving, especially how to work as teams in the identification of opportunities for improvement, how to define these opportunities and how to work together to make and hold the gains from improvement.
3. All classes are conducted according to the principles of quality management. This means:

¹⁰ Feuerstein, Reuven and Hoffman, Mildred B. "Intergenerational Conflict of Rights: Cultural Imposition and Self-Realization. Viewpoints in Teaching and Learning" Journal of the School of Education, Indiana University 58 (1/winter) 44-63 1992

Students participate with teachers to determine:

Standards of excellence
 Methods to attain excellence
 What the teacher's job is.
 What the student's job is
 How, together, they will
 Document
 Display
 Defend

their accomplishments to third parties

Students will evaluate their own work and will have had a hand in setting the standards and methods of evaluation.

4. All personnel in the school, including students, faculty, administrators, support personnel and parents will be involved in continuous improvement.
5. Students and teachers will be actively engaged in the improvement of the learning process.
5. The administration of the school district, including the board of education of the state, will understand and practice quality management principles.

The Integration of Enrichment and Coursework

If time is given over to Instrumental Enrichment, there then remains the question of how the normal coursework should be modified. I am indebted to Julie Cowell of Oakland, California, for examples she has developed in the teaching of mathematics.

It is well known that it is not to difficult to teach students to do various simple operations in a rote manner. Thus, the adding of numbers or even long division can be routinized. Today these operations are accomplished swiftly on a small inexpensive hand held calculator. What students do not, in general, know how to do, is to put these skills to work in a way that is useful to them. They have great difficulty with *problem formulation*., especially in translating from a *word problem* to a *mathematics problem* . Here is a simple example of how Julie Cowell has approached the task.

Q. *How much is half of two plus two?*

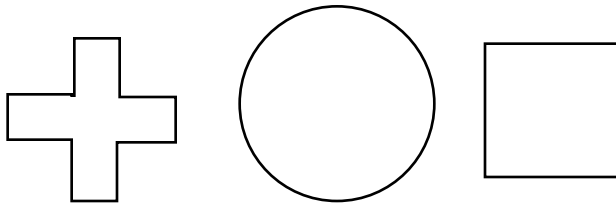
Now ask yourself these questions:

1. How did you solve this problem?

2. What did you say to yourself as you solved it?
3. How did you check yourself?
4. If you had to explain it to someone, how would you do so?
5. Do you have more than one way to solve this problem?
6. Why did you pick the method you used?

Here is another simple problem which, while not obviously a problem in mathematics (it is not arithmetic) is directly related to mathematical reasoning. When considering this problem, you are asked to explain the steps you took to be sure you got it right.

If the circle below is taller than the square and the cross is shorter than the square, put a K in the circle. However, if this is not the case, put a T in the second tallest figure.



How would you explain to someone else how you solved this simple problem? Do you know more than one way to do it?

There is an extensive literature on problem solving methodologies. It is time to bring them together, in a coherent structure and to change the way schools are managed, so that the transformation can occur.

Conclusion

The implications in the teachings of Deming and Feuerstein are enormous. Success will depend upon the actions of many people, each of whom has learned about the works of these two great men and started to put them together.

If you try to introduce people to a paradigm shift, they will hear what you have to say and then interpret your words in terms of their old paradigm. What does not fit, they will not hear. Therefore, a change in paradigm cannot be brought about by talking. People have to experience the change, or at a minimum see other people experiencing it, before they will begin to understand what you are saying.

Today, in various places around the World, schools are attempting to put

the wisdom of Deming and Feuerstein to work. While there are hundreds of schools so engaged, they are but a very small fraction of all schools.

Once I asked Dr. Deming what it takes to succeed. His reply was swift and to the point: "A critical mass of people who understand and who work consistently."