

The Transformation of American Education to a System for Continuously Improved Learning

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The "System" of Education in America

In all my travels, to many places in this country and around the world, I find dedicated and devoted teachers, who want to do a good job. In California, because of the budgetary crisis, some teachers routinely use their own private money to pay for supplies to use in their classrooms. I am angered by the loose talk of people who say they can fix what is wrong with education by making teachers more accountable. By and large, with rare exceptions, the teachers are not the problem. When they are, it is the fault of the management that hired unqualified teachers in the first place.

The components already exist to create a high quality system of education in every state and territory of the Union. These components, the grade schools, the middle schools, the high schools, the community and junior colleges, the vocational-technical schools, the Universities and Colleges, with their graduate schools and the staffs and facilities, are the components of a *potential* system. I emphasize the word *potential*, because, across the land, these components are not operating as a coherent system. They are rather a loosely knit confederation of independent, badly managed, units.

These systems are now so badly managed that ordinary citizens are in revolt. In California, as these notes are written, there is a vigorous campaign to institute a voucher system, which, in my view, will seriously damage the system of public education. Under this system, parents will have a choice to send their children to private schools, with money removed from the budgets of public schools to cover part of their costs. This proposal has been caught up in a debate over religion in schools, sex education, the teaching of evolution and several other contentious issues. The vast majority of the population, I believe, does not care very much about these issues, but some are so fed up with the failures of the system that they are ready to join in a movement, any movement, promising a change in the way the schools are managed.

The situation is similar to about a dozen years ago in American industry where the transformation to a new way to manage is at last underway. There is one important difference between American industry then and the American educational system now. Our captains of industry were asleep at the tiller. But in education there is an awareness of the need and a desire to change.

The good news is that, although educators have *known* for a long time that they were in trouble, now many are ready to act. The bad news is that at the level of boards of education and superintendents of schools, and in the political arena, most people do not accept that they, too, are a significant part of the problem and must learn new things. They have yet to accept that they need new paradigms. Most still think that schools ought to run as they did years ago, when they were in school.

But Will Quality Management Really Work in Schools?

Today we have a few good examples of schools which have made spectacular improvements in situations where success was not expected. Their results are clearly traceable to the use of quality management principles. I hasten to say that only a handful have achieved the results of which quality management is capable, but they are on their way,. It is gratifying that even when they have only started their journey, they already see tangible results.

The evidence from two schools is particularly compelling. Quality management has been demonstrated to work in teaching children who are, by all measures, "disadvantaged". Mount Edgecumbe High School, in Sitka, Alaska, founded as a school for rural and Native Alaskan Indians, has attracted worldwide attention to the achievements of its students. They take students who are known to be "at risk", who come from remote village schools, with a wide variety of economic and social backgrounds¹. Under conventional approaches to education, most would be expected to just drop out.

The George Westinghouse Technical Vocational High School, in the heart of Brooklyn, has made dramatic gains:²

- 69% of the graduates go on to college, even though many of them are the first in their families to finish high school.
- Dropouts in 1991 were 5.3% compared to New York City's average rate of 17.2%
- Parent involvement has increased from 12 to 211 parents in PTA meetings, even though dues have tripled.
- Union grievances fell from 26 in 1991 to none in 1992

If quality management can succeed in Brooklyn, and at a remote location in Alaska, it will work anywhere!

The two examples cited, and there are others, were successful in spite of the system in which they were imbedded. They have not been able to tap the full potential of quality management methods because the management methods of the systems, of which they are a part, have not yet changed. What has changed has been the management approach within the classroom and within the school.

If the good results are to be obtained everywhere, the entire system of management of education will need to be changed. We are not talking about *restructuring* the entire system. Restructuring, as we see it in industry, means mostly chucking workers overboard and managing a smaller system in the old way, continuing the decline. We are talking about managing differently.

¹ The variety of cultures represented is impressive. Yupik Eskimo, Inupiaq Eskimo, Tlingit, Haida, Athabaskan, Aleut as well as other Indians and some Caucasians. From time to time there will be a Japanese exchange student in attendance.

² Franklin P. Schargel, "Yes, Quality Can Thrive in Inner-City Schools, Too!" page 4, Quality Network News American Association of School Administrators, September /October 1993.

What is Required for the Transformation to a System?

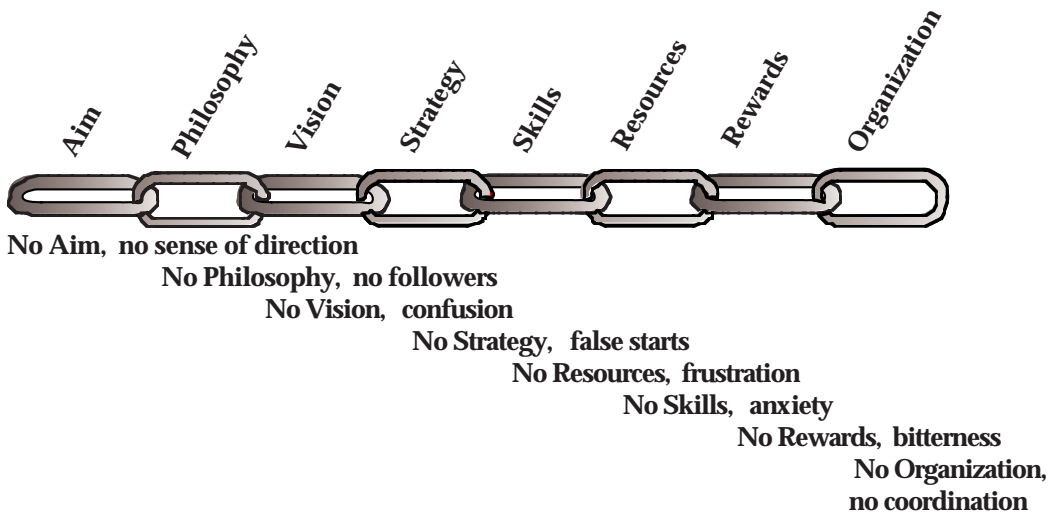
What is needed is a transformation of the management of the entire system, at all levels, from the classroom to the state boards of education. In the classroom teachers manage the teaching/learning process. They need to learn how to do it the quality way. No one has taught them how to "manage" the process. Teachers have been taught to "teach", that is, to organize and deliver information. The difference between teaching and managing the learning process is profound. As a *manager* of the learning process, the teacher strives, with the help of the students, for continuous improvement of how the students learn. This change is incomprehensible to those who have not seen it themselves.

In the school we are concerned with how the principals lead the teachers in continuous improvement. That's a new idea for principals, too. They have had very little instruction in managing and none in managing for continuous improvement.

In the district the superintendent should help principals and teachers to improve. Superintendents are selected according to a Darwinian process in which only those survive who are strong enough to fend off the public and the board of education, spar with the politicians and fight for a budget. I admire the strength of the people who have the courage and perseverance to become superintendents in large cities. At the same time I wish I could give them a quick transfusion of capability in quality management, for without it, they will be forever doomed to the life they lead now, which, I think most will admit, is no life at all. The half life of these superintendents, in the major cities, is distressingly short.³

To achieve the necessary transformation, requires a cadre of leaders who understand quality management and how to put it to work. If they are to succeed, the leaders will require attention to eight factors.

Table I
Eight Factors for Success and The Consequences of Omitting Any of Them



We shall consider these eight elements, one at a time.

³ It has reached the point where superintendents expect to be fired and to sue for compensation. There are now lawyers who specialize in this type of litigation!

What is the AIM of the System?

No Aim, No Sense of Direction



The first element the leader needs to assure is agreement on the aim of the system. Agreement on aims cannot be ordered, it must be won. In a system as large as the educational system of a state, or even a district, it is essential to have a statement of the aim of the system that is simple and yet provides the basis for the many decisions which must be made at all levels. The statement should attract general support and yet be specific enough to give guidance to everyone working in the system. It is possible to frame such a statement. Here is an example.

**The Aim of this System of Education is:
"Provide a Quality Education for Everyone"**

It is, of course, difficult to quarrel with this statement until an unambiguous definition of the phrase "Quality Education" is given. Some private systems will eliminate the word "everyone" but that is not what our founding fathers intended for public education. The song "My country, 'tis of thee" has a second verse, not now sung, which refers to a "school on every hill", so strongly did our forefathers believe in education.

What Does "Quality in Education" Mean?

Once upon a time a speaker was holding forth before a group of Vermont farmers. One Vermonter leaned towards another and asked, "What's he talking about?". The other replied: "He don't say."

Well I do say. We are talking about quality education, so it is necessary to begin with the most important definition.

QUALITY in education is what makes learning a pleasure and a joy. Some measures of student performance may be increased by threats, by competition for grades or prizes, but the attachment to learning will be unhealthy. It requires a quality experience to create an independent learner.

JOY in learning is ever changing. What is thrilling at one age is infantile at another. Teachers must be ever alert to engage the students in a discussion of what constitutes a quality experience, how they shall know it, how they shall measure their accomplishments and how they shall demonstrate to others what they have done. The negotiations and discussions are never done. It takes constant engagement to wed a student to learning.

Joy in learning is not necessarily accompanied by joyful sounds or even smiling faces. It is often manifest in a serious expression on the scholar, so engrossed in reading and contemplation, as to be oblivious to the surroundings. Most teachers have experienced this joy of learning and they want to pass it on to the next generation. Quality management methods enable them to do it.

This definition gets to the heart of what is wrong with education in America today. Students do not put their hearts into their work. They do the minimum they can, barely satisfying the teachers. They find the assignments boring and less attractive than many other alternatives, such as street gangs and television. As we have learned from experience with quality management in classrooms, it does not have to be this way. We can provide experiences which draw upon the *internal motivations* of students, but this can come to pass *only* if the way we

manage the processes, from the classroom to the board of education, are changed in a fundamental way.

Today, if every student in our schools is to experience joy in learning, and therefore to become devoted to lifelong learning, a drastic change in the way we conduct the teaching and learning process is required.

What is the Philosophy Behind Quality Management?

No Philosophy, No Following



The philosophy of quality management is basically a humane philosophy. Unlike earlier philosophies of management, quality management postulates most people are valuable, educable, want to do a good job, and are willing to work.

The quality management philosophy differs from that of Frederick Winslow Taylor, who wrote:

Hardly a competent workman can be found who does not devote a considerable amount of time to studying just how slowly he can work and still convince his employer that he is going at a good pace.

Most of the people in positions of power in the educational system believe that statement applies to students, too. Taylor also wrote

Under our system a worker is told just what he is to do and how he is to do it. Any improvement he makes upon the orders given to him is fatal to his success.

The older ways to manage date back to the building of the pyramids. Management has been viewed as a social class, with privileges not given to others.

**Ever since the building of the pyramids,
Management has been treated as a privilege
and Labor as a commodity.**

This view in industry is predicated on an image of the organization displayed in figure 1, "headless workers" caught between the management of their company and management of their union.

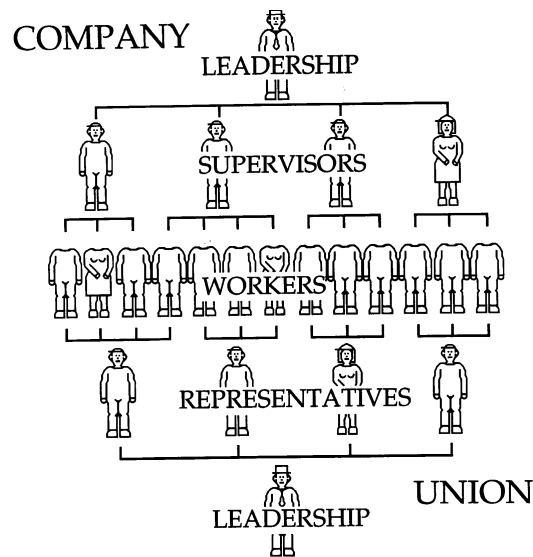


Figure 1. Workers caught in the middle.⁴

Most people in industry believe is the ways things are and ought to be. If you are on top you are apt to believe you are there because you deserve it. It feeds your paradigm.

Life's experiences have, in all too many instances, nearly killed the internal motivation of many people, and to a large extent Taylor's descriptions have been self fulfilling. But those who have tried quality management have found that most people, even the "hard cases", when treated differently, have changed and become enthusiastic about their work. This is something which cannot be proven by logic alone. It must be experienced to be believed. Even hearing it from workers at Ford or Harley Davidson will not convince you. Try it. You'll like it!

Many sincere educators blame the decline in learning on forces outside the school. They point to poverty, one parent families and a general decline in civility in society at large. These observations are accurate, but they are not acceptable reasons to lower our expectations about what these children can do and become. Successes in inner city schools have shown that these handicaps may be overcome. Yes, many parents have abdicated their responsibilities. A few schools have demonstrated that they can make a big difference for these disadvantaged young people. The good results occurred only because they were *managed* differently.

The basic philosophy of quality management is that the schools can and should make every student an autonomous team player and that students have an internal motivation to so become. They are no different than the workers in our factories, except a) they have not as much experience with bad management and b) the effects of what is done to them in the schools have greater consequences.

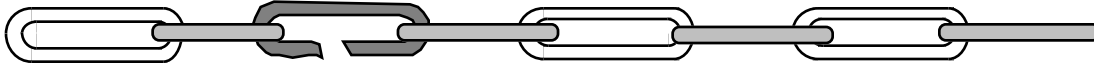
Teachers in Kindergarten and the early grades observe that children come to school eager to learn. The current system kills this drive. As many thoughtful educators have shown, the use of extrinsic motivators such as ratings, grades and competitive rankings, kill the students' innate desires to learn. This, too, is an element of the paradigm shift which parents and students have yet to learn. Alfie Kohn has written and lectured extensively on the destructive elements in the current system and has amassed an impressive amount of data.⁵

⁴ Diagram courtesy of Goran Wall, University of Karlstad, Sweden

⁵ Kohn, Alfie, No Contest

The Vision for Classrooms, Schools, Districts and States

NO VISION = CONFUSION



We visualize every classroom, school, district and state as part of a large learning community, in which everyone is sometimes a teacher and sometimes a learner. Everyone is learning together.

In a quality school, teachers do not pose as the ultimate source of knowledge. Teachers should know their subject well, but in the classroom they should concentrate on learning, not teaching.

Beginning at the earliest age, in a quality school children will be taught the tools of quality improvement and will begin by applying them to their own lives, to the improvement of their education and to improving the operation of their school. Experiments by Theresa Hicks at the level of the second grade, have produced most exciting and heartwarming results. Her students have helped her to organize the way she teaches. Note that I said, "helped", not "dictated to". In quality management, teachers do not abdicate their responsibilities; the students help the teacher to carry them out.

In this vision of a learning community, teachers and administrators, with the help of the students, will work together to improve the operations of the school. They will learn by experimentation and they will share the results of their experiments with other teachers, administrators and students.

In the school district, quality management will replace old style management. Every person in the headquarters staff will consider their job is to be a resource which helps all learners (including some who are called "teachers"). No longer policemen, making sure that rules, regulations and standards are upheld, but rather facilitators of change and suppliers of important services to the teachers, their customers. Furthermore, they will look to the teachers, as their customers, to define quality of service. They will NOT look to their bosses for approval, for their bosses, too, will understand that their obligation is to make learning easier, not harder.

In the quality school, at an early age students will have become co-managers of their education.

The Strategy for Change

No Strategy, False Starts



The transformation process requires a leader who has a workable strategy in mind and can persuade the organization to adopt it.

The leader should understand the difference between a *plan* and a *strategy*.

IN A PLAN you know what you want to do and you know exactly how to do it. You start from the desired outcome and work backwards. *Each step in a plan is designed to support the steps which follow.*

IN A STRATEGY, you know what you want to do but you cannot say exactly how to do it. There are things to be learned along the way. *In a strategy, each step is determined by what is learned at the previous step.*

All that can be discussed in the beginning is a strategy for the transformation, not a plan. Every organization which has successfully made the transformation will tell you: It is not a tidy process.

The transformation should begin in the classroom where the teachers and students approach the teaching/learning process in a new way, a quality way. Ultimately, everyone in the system will be affected, but the change should start in the classroom. The primary purpose of the system is the education of the students. That's where change should begin.

It is tempting for administrators to begin by applying quality management methods to the front office where the processes and problems often appear to be similar to those in commercial companies, but the similarities are unreal. Consultants, on loan from industry, are often available to help without cost. It is a tempting strategy to employ this free help and start by straightening things out in the front office, but it is not a good strategy. If the administrators try to put quality management to work before anything changes in the classroom, they will simply be getting better at doing things they probably should not be doing in the first place.

I recall one supervisor in one community who, when asked, what is the biggest problem you would like me to help you with, replied, "Help me figure out a better way to deal with grievances from the teacher's union." But that problem cannot be fixed in the front office. As the experience at George Westinghouse Technical and Vocational School shows, when the situation in the classroom is improved, the union complaints disappear.

It is also tempting to plan to train everyone from the top down before involving the teachers. I argue against such a strategy. Instead, involve *volunteers* from all levels, from the very start. There are several reasons for this advice, most of them based on the fact that the leadership is learning a new paradigm at the same time as the rest of the organization. They are not just learning new skills. They are learning new ways to see their world:

There are certain to be many people in the system do not want the proposed change in paradigm. They will quietly fight it, all the while pretending to be supportive. The leadership, especially while still in the early part of the learning curve, does not have enough energy to carry them along.

In general, the higher levels of the enterprise do not know what the problems "in the trenches" really are. They will consistently work on the wrong things. There is a high probability they will have a distorted view of what is important. They do not understand causes. They only see results. Quality management teaches us to identify and work on causes, not symptoms.

Trust and cooperation are necessary to bring the transformation about. Therefore, do not begin by teaching only the top levels, leaving everyone else in the dark, and therefore suspicious. Begin with volunteers, drawn from all levels, and use educational problems taken from the classroom as a vehicle for learning. This will expose the top managers to "reality" and relieve the fears of those who work on the front lines.

When people see, from the experiences of others, that "it really can work here", see the impact on the students and recognize the demonstrated commitment of the leader, they will be persuaded to join and the movement will grow. This leads to a rule:

**When introducing quality methods in an organization
Do it according to the new paradigm,
Not the old.**

The strategy proposed here leads towards an entire school district becoming one very large learning community. The strategy does not call for the district to change overnight. The strategy calls for the district to begin on a small scale, perhaps with one principal and one teacher, one school, in one classroom, working together to improve a process. Everyone in the district should be kept informed and encouraged to try similarly. The central authority (the people who control the funds) should identify those who are genuinely changing and give them encouragement and support. The leaders should become involved with these change agents in order to learn more about quality management.⁶

Over time the district should strive to become a place where everyone is teaching and learning. The job of the leaders is to make this change happen. The leader should say, by word and deed, "Follow me."

The change can begin within one school in a district, with the encouragement and participation of the principal. Teachers and students can begin by experimenting with different ways to improve learning. Teachers should meet to compare notes. They should send their students to sessions with other students to compare what they have learned when they worked in different ways. School administrators, principals and the superintendent, should be involved in studying what they and teachers can do to remove barriers to improvement.

Don't Give It a Name!!

Whatever else you decide to do, do not give your activity a name.

A name provides a handy target for naysayers.

If you give a name to what you do, you have to say what is included and what is not. Since you don't know, it will soon be evident that you do not know what you are talking about.

Other organizations using that name may falter and this will have an effect on the people you are trying to convince.

Green⁷ says that many Japanese companies began by trying to solve an almost overwhelming problem, one which threatened their existence. Afterwards they looked back at what they had done and decided to give it a name!

What Happens in a Classroom in a Quality School?

In the classroom, the teacher and the students, together, should define goals which will help them to achieve the aim of the system. One goal should be to increase the ability of students to act as autonomous team players as depicted in the following diagram of possible roles of teachers and learners.

⁶ Methods for doing so are described in "Planning the Quality Visit", Quality Progress, published by ASQC, April 1991, v 24, N 4, Pg. 30. See also page 256 of Quality First a compilation of essays on applying quality management., available from the National Society of Professional Engineers, 1420 King Street, Alexandria, VA 22314 (703) 684 2800

⁷ Green, Richard Tabor, Global Quality, Business One Irwin, Homewood, Ill 1993,

Possible Roles for Teachers and Students.⁸

TEACHERS:	DO TO THE STUDENTS	DO FOR THE STUDENTS	DO WITH THE STUDENTS	ENABLE THE STUDENTS
STUDENTS:	No Choice Captive Hostile	Captive Passive Do Minimum	Dependent Accepting Rely Upon	Interdependent Investigators Empowered
Reaction	Let me out!	Must I?	Will it be on the test?	Joy in Learning!

----->> **Direction of Increasing Autonomy**----->>

It will be very difficult for some experienced teachers to accept the idea of a teacher as mentor who helps students to learn instead of acting as an all-knowing "knowledge provider" . A teacher once said to me, "When I start a semester, I close the door and then say to the students, 'Remember, in this room I am God!' " She was not the only teacher I have met who will require retraining.

How Do You Create Joy in Learning?

In a very perceptive book Professor Yoshio Kondo has described three elements which are essential if people are to find joy in their work:⁹

An opportunity to make a creative contribution which will be appreciated and desired by someone else. (Feeling useful)

The opportunity for physical activity. People do not like to be chained in place. (Physical activity)

The opportunity to share the joy (and pain) of accomplishment (or frustration) with colleagues. (Socialization)

Thus in a classroom aiming to provide joy in learning, the students should be engaged in a team activity requiring them to contribute, creatively, doing something of value, useful to someone else. They will not be obliged to sit for long times in one place but will be expected to move around the classroom in a purposeful way. They will work cooperatively, forming teams to accomplish a useful task and they will share the joys of success. Success will be measured in terms meaningful to them and will go beyond the concept of grades.

Class projects can be useful vehicles to bring out the best in students. I recall experiences with students in engineering, designing devices to help doctors and nurses provide therapy for disabled children. The response was extraordinary. Helping crippled children is a great motivator. In another school students made teaching aids for use by younger children.

One of the main sources of joy in work is the realization that what you are doing is appreciated by someone else. It is a natural instinct, known to every parent who has ever accepted a drawing made by a kindergartner or a nice newly made mud pie from a toddler.

⁸ This table was suggested to me by students at Mount Edgecumbe High School in Sitka, Alaska, after they had experienced the transformation.

⁹ Kondo, Professor Yoshio, Editor, Human Motivation, 3A Corporation, Tokyo, Japanese edition 1989, English Edition 1991, ISBN 4-906224-64-4 C1034. This little book should be read by all teachers who wish to lead their students in quality improvement.

The Students as Co-Managers of Their Education

At this point, it is necessary to return to the definition of a quality education. It is important to keep in mind:

The student is NOT the Product
The Education of the Student is the Product

If this product is to be of high quality, it is essential that the student take an active role in the development of the product. Just as it happens in industry that the workers on the line are the only ones who really know what is going wrong, so it is that the students, who are closest to the processes of teaching and learning, can identify what is wrong, *but only if they are taught how to observe and how to take and analyze data*. To understand the students' roles in improving the teaching/learning process, we need to make a sharp distinction between a learning objective and a learning process.

A **learning objective** describes a goal that a learner is to attain. Learning goals are set by adults. As students mature, they can take more and more responsibility for setting learning objectives until, finally, as adults they set their own learning objectives.

A **learning process** describes how a learning goal is attained. Students should be involved in improving their learning processes. They should be taught how to do so, beginning in the first grade.

Consider what a school would be like if by the time they entered high school, every student will have had eight years of training in how to be responsible for improving how they learn and had experienced success at it.

Earlier, when discussing *Quality Education*, I equated Quality to Joy in Education. Now it is time to be more specific about what comprises a good education. Before we can do so, it is important also to distinguish between features and quality.

Features are what you put into your product to make it attractive to particular customers. In education this corresponds to an emphasis on music and art, or perhaps an emphasis on shop skills or electronics and for some schools it might be an emphasis on science. Features are often recognized by the size of the laboratories or the basketball court.

Quality has to do with the processes by which the features are made available. One can have a school with many features but it can still deliver low quality education.

Learning objectives will define the *features* of a school's educational offering. The *quality* will be defined by the way the objectives are attained.

We may define learning objectives in four categories.

Knowledge enables us to understand. Knowledge allows us to connect new things learned to things already known. Knowledge can be theoretical, involving the manipulation of ideas in the mind, or it can involve a physical interaction with things outside our own bodies. It can also be both. When we acquire knowledge, we know something we didn't know before. We recognize many "disciplines" of knowledge, such as history, literature, science, social science, music, and art as well as many others. We also can recognize different levels of knowledge. Math in

high school is not the same as math at the level of a graduate school. Finally, we need to keep in mind that all knowledge is not gained in school.

Know-how enables us to do something. Know-how requires skill, and involves procedures and processes for application. We distinguish various kinds of know-how, such as writing, speaking, arithmetical manipulation, dancing, playing a musical instrument, operating a lathe, a computer, or an automobile. The list is endless. All know-how is not taught in school, either. Some is learned in gangs.

Wisdom enables us to set priorities. We recognize wisdom in others by the way they chose what to do next and what to leave to a later time. Wisdom always involves a set of values. Wisdom guides us in making choices.

Character defines how we behave towards ourselves and others. Character may be described by various *attributes*, such as courage, persistence, cooperativeness, ability to work in groups or alone, proactiveness. These are the attributes which make us *human*. Character traits define the concept of *humanity*.

An education which does not pay heed to all four categories, in my opinion, is not a quality education. The failure of schools to consider, seriously and openly, the last two categories has made them vulnerable targets of the religious right and provided the basis for the recruitment of many who share the same concern, even if they do not endorse the same "cure".

Levels of Ability

For every competency, we need to define levels of ability, so students will understand what is expected of them. We recognize that to speak before both Houses of Congress requires a different level of speaking ability than to speak before classmates. It requires a different level of understanding. It requires certain character traits, such as courage. The levels expected should not be unknown to the learners.

To develop learning objectives, it is useful to use a tree diagram, such as illustrated in figure 2. The tree depicts what is required of someone to act as a facilitator in quality improvement. Starting from the general objective of being able to facilitate quality improvement teams, eleven competencies are identified, which are then described in finer detail in 97 items which appear in the last "branches" of the tree.

A level of attainment is associated with each competency. These levels are described in the table immediately following the tree diagram. The descriptions of the levels is not final and should not be taken as "given". The levels should be redefined with each new class of students. The levels suggested by the previous class should be reviewed and improved. It might even be a good idea to invite a student or two from the previous class to come back and discuss their experiences and suggest improvements. The act of improvement is an important learning experience.

Peer pressure will work for the teacher, instead of against the whole system, as it so often is in conventionally organized classrooms. The attitude is not new. My grandparents sang, "No more school, No more books, No more teacher's dirty looks."

Only a portion of the tree diagram is shown in figure 2. The entire tree diagram, with associated levels of attainment, is reproduced in Appendix I. The overriding objective is to gain student participation and have them contribute to the definitions of levels of competence. Experience shows this participation has a profound effect on the students. If the teacher creates a small ceremony around the establishment of learning objectives, and of levels of

competence, and if these have been arrived at through genuine participation, the effect of peer pressure on the students will be in the teacher's favor.

Where Do We Find The Resources To Do These Things?

No Resources, Frustration



The standard response of many people in industry, when it is proposed that they need to learn something in order to practice quality management, is "We haven't the time to do these things", or "We can't afford to do it."

My observation, and that of many other consultants, is that when an enterprise does NOT use quality management, it has unused resources aplenty. My advice, in general, is that if you are operating in the old paradigm today, you should not begin by asking for more resources. If you just begin, now, to apply quality management to any of your significant problems, you will uncover resources that you did not recognize and which are now being wasted. In due course you will uncover the time you need. It is there now, unused.¹⁰

The first concern of many teachers is whether involving the student in quality improvements will subtract from the time they have to do their required studies. We know from practical experience that what is proposed so increases the efficiency of the learning process that students will progress much more rapidly and learn much more in the same time than they ever did under the old ways. In fact, based on my own experience and that of David Langford, it is altogether likely that even if out of a 12 week semester, two weeks are devoted to discussions of objectives and competencies, the enhanced learning of the students afterwards will more than make up for the time spent at the beginning.

Why does learning about quality improvement method make the students more efficient in the use of their time?

Recognizing that it is not teaching, but learning, which determines the pace of education, it is evident that the rate of learning depends on how enthusiastically the students tackle their assignments. Over the years teachers have learned how much homework the students will *tolerate*, and they have adjusted their assignments to this level of toleration. To get students to do more, teachers have employed the "carrot and stick" approach. By a combination of rewards and threats, they have tried to force the students to at least do the homework. The students, in return, have done their best to outwit the teacher. They adopted the tactics Taylor attributed to workers.

To change the situation requires harnessing the *internal motivation* of the student. The key to harnessing that internal motivation is participation. The key to success lies in the observation by Larrae Rocheleau:

**If we want students to be more responsible
We must teach them to be more response-able.**

¹⁰ These remarks should not be used to deny the need for resources. Some schools in America are so badly underfunded that they do not have the necessary textbooks and supplies. In Boston I spent an entire day going from one company to another to scrounge computer paper so students could use the reverse sides for their printers. They had computer printers but no paper!

Because students are to be engaged in improving things, they need to learn the tools of improvement. These are the tools developed over the last 40 years in the USA and Japan and now applied in quality managed companies world-wide. These tools have never been part of the curriculum of business schools, engineering schools or any of the professions. Teachers and school administrators have never been taught quality improvement tools. Fortunately, the tools are simple and easy to learn. Within the last few years we have successfully taught many of them at the level of the second grade. High school students grasp the ideas rapidly; so rapidly they often teach one another, and in some cases their teachers, without any formal instruction.

The quality improvement tools are less complicated to learn than football plays, often mastered by students who are failing trigonometry at the same time.

The hardest people to teach are professors in the university, the CEOs in industry and, worst of all, politicians. Their favorite expression sounds like a Japanese word, "IAKI", but isn't. It stands for "I already know it".¹¹ The problem is that they are barely at level 1 of Knowledge and at level 0 in Know-how, Wisdom and Character.

The second problem for the teachers (and others) is to find the time to learn the tools. In the appendix I have reproduced a proposal from Professor Harry Roberts, concerning a way to reorganize your personal life so as to find the time for learning.

The Necessary Skills to Use Quality Management Methods in the Classroom

No Skills, Anxiety



To be called upon to perform a task for which you are not prepared is an anxiety producing experience. Quality management in the classroom requires new knowledge and competencies of teachers. There are quite a few new skills which teachers will need to master. Fortunately, each of the skills is easy to learn and can be fun to apply. If taught in a quality way, acquiring these skills will be a joyful experience. I urge every person who offers to train teachers in quality management to adopt this rule:

**Teachers do not teach as they are told.
They teach as they have been taught.
Teach quality methods in a quality way.
Provide joy in learning!**

Figure 2 describes many of the things teachers should learn if they are to apply quality management in the classroom. Fortunately, each of the competencies listed in the tree diagram is easy to learn. If taught in a quality way, they will be fun to learn and to apply. Appendix II gives a list of useful references.

It is helpful to use a matrix in which the rows represent learning objectives and the columns represent levels of attainment. Such a matrix is shown in Appendix II to this paper. It is taken

¹¹ Professor Shoji Shiba, a quality consultant from Japan, and acknowledged master teacher in quality management, considers "IAKI" and "PITM" to be words forbidden in his classes for executives. "PITM", he says, stands for "Prove It To Me".

from the work of David Langford and his students in Sitka, Alaska.¹² and has recently been updated by him. In the matrix, the columns define levels of ability and the rows define the levels of attainment.

What are the Tools? Where Do I Go to Learn Them?

Fortunately quite a few books have recently appeared which contain simple explanations of most of the tools. Only a few of these books have been written for educators. A list of useful reference books is given in Appendix. III. The list is not complete and grows daily.

If Adults Set Learning Objectives, Who Does It and How?

How the features of an education, i.e., the learning objectives, are to be defined, needs to be reconsidered from time to time. I propose that teams of people who have been taught quality improvement method will be much superior to the conventional "curriculum committees" on which I have unhappily served in the past. Since it is the responsibility of adults to decide what knowledge(s) and what know-how(s) are to be set as goals for young students, the process of deciding upon the elements of the competency matrix should involve all the "stakeholders", i.e., the parents, the teachers, potential employers, government officials and school boards. The meetings should be conducted using quality management methods. Groups of parents and other advisors should be taught group problem solving methods such as nominal group technique, affinity diagrams, flow charting, quality function deployment, etc., etc.¹³

Teachers should develop diagrams like figure 2 and discuss them with their students at the start of every semester.

As students grow older, they need to take on more responsibility for setting these goals themselves. As mature adults they are entirely responsible for deciding what they need to learn next. One of the most important purposes of an education is to develop this kind of autonomy in the learner.

How often have we told our students that education was a life-long learning process and then failed to give them the tools to help them deal with the many baffling choices such an exhortation implies?

How Can You Recognize the Existence of Joy in Learning?

I propose that we judge whether joy in learning is occurring by watching for these process quality indicators:

Students actively participate as co-managers of the process of improving the way they are learning. Students working in teams, teaching one another.

¹² My thanks to David Langford for permission to use this figure. It has been redrawn somewhat to fit this presentation.

¹³ Lewis A. Rappaport, Principal and Franklin P. Schargel, Asst. Principal, at George Westinghouse Technical and Vocational High School (see reference 1) have reported good success involving parents in school improvement projects after they were given instruction in quality improvement methods by IBM quality instructors.

The students actively participate in defining what it means to achieve the learning objective with style and excellence.

The students actively measure their own performance against these standards and are helping one another to improve. Students take turns acting as leaders, as facilitators, as observers.

The students actively compile their own documentation to demonstrate to themselves, the teachers and others that they have achieved their objectives in a quality way.

Having drawn a distinction between the task of setting a learning objective and improving a learning process, it becomes easier to see the nature of the paradigm shift. We still expect adults to guide the young into recognizing what they need to learn, and how to recognize excellence, but we expect the learners, at every age, to take more and more responsibility for working with the teacher to improve *how* they learn.

The System Rewards Me For Following the State Mandated Syllabus. What to Do About That?

No Rewards, Bitterne



There are two systems of rewards to consider. The first is the reward system the students experience. That system is set by the teachers, with a little help from the administration, the state board and the Universities, not to mention the various kinds of examinations, SAT, etc.,

Then there are the rewards for teachers.

These are linked, for what teachers do is a reflection of what they are rewarded for doing.

According to the proposed strategy, it is best to begin with a discussion of reward systems in the classroom.

It is not intended that a student receive a grade on each of their competencies. Rather, the students should follow the dictum promoted by the students, themselves, at Mt. Edgecumbe High School: "If it isn't perfect, it isn't done." They should attain agreed upon competence levels with style, with excellence, without error. No more 75% right. 100% or you haven't finished. The teacher and the class should agree on how to tell if a student has attained a certain level and that agreement should not be compromised. Different students might attain different levels in different competencies. This will show up in their student profiles. The students would not be ranked, however.

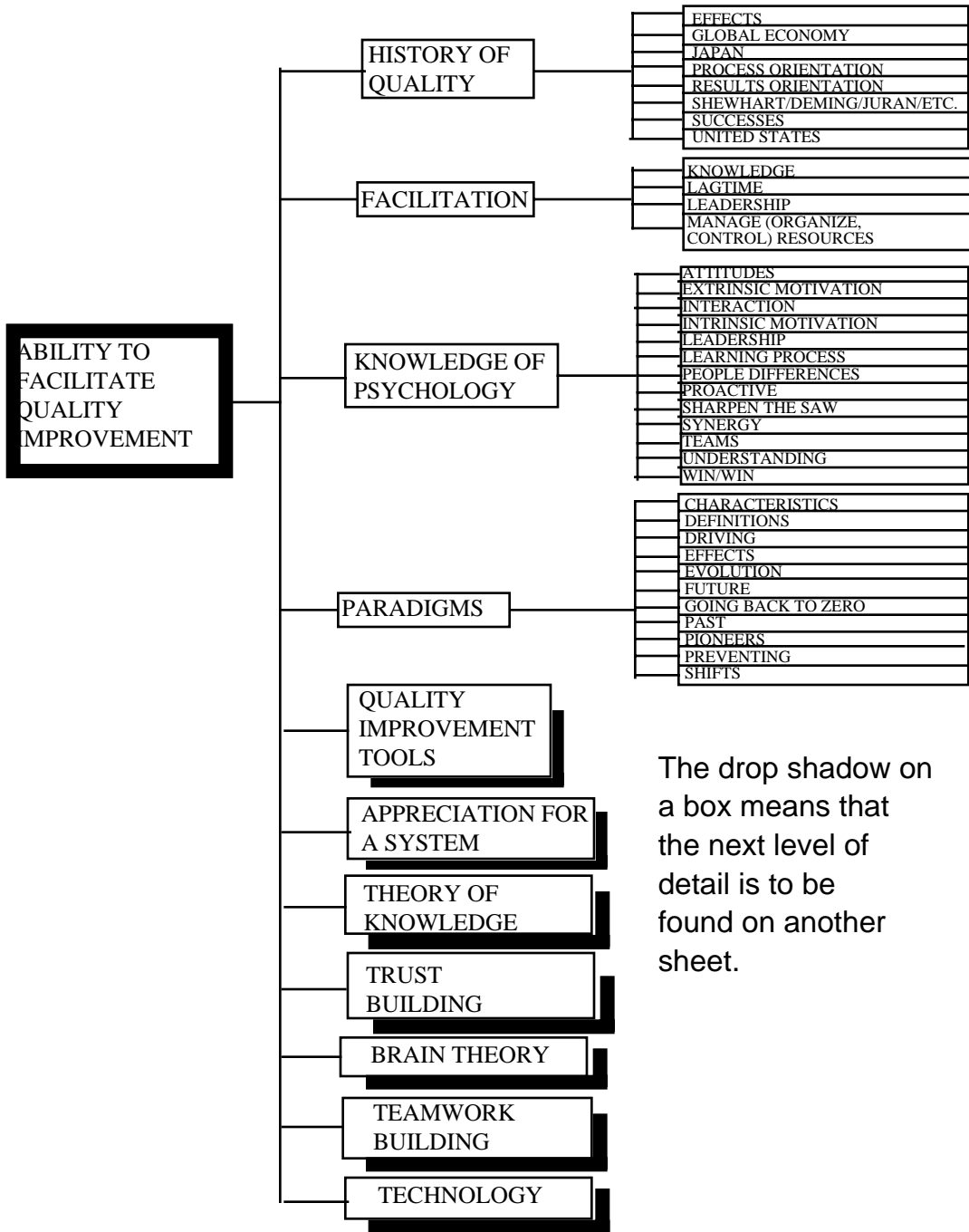


Figure 2. Tree diagram for competencies of a quality improvement facilitator. See Appendix I for greater detail and the linkage to definitions of levels of competence.

Defining Levels of Competence

	Level 1	Level 2
KNOWLEDGE	Able to explain, in own words, what the subject is about, answer simple questions posed by a teacher, such as Who? What? Where? When? Why? How?	Without a teacher, be able to organize information about the subject and give a coherent explanation to someone else.
KNOW-HOW	Able to solve a problem or do a task which has been defined by the teacher and to perform to a prescribed level.	Able to define a task and carry it out without the guidance of a teacher. Able to critique own work and work of someone else.
WISDOM	For a given task, with the aid of a teacher, able to develop a plan to carry it out, to use resources which have been identified by others.	Able to decide what to do without being told, to make judgments about the relative importance of possible courses of action, to identify and use proper resources.
CHARACTER	To understand the character attributes required to do a particular task and to be able to know, with the help of a teacher, what one's strengths and weaknesses are.	Without the direction of a teacher, to be able to work with others, where necessary, or alone, where necessary and to behave appropriately under either circumstance.

What About Testing, Evaluation and Grading?

There is a difference between *evaluation* and *grading*. In any *grading* system, half of the people will be told they are in the lower 50 percentile, and there is nothing anyone can do about it. It is devastating to self esteem. In my opinion, if 50% of the children have been told, at an early age, and repeatedly, that they are failures, the stage has been set for the decline of the educational system. If you are convinced you are not able to compete in something, then you will avoid competing. It's that simple.

On the other hand, people need to know how they are doing. Tests have their place in education, but their purpose should not be to grade the student's past performance. They should be a guide to the future.

The only legitimate purpose of an examination is to permit the teacher and learner to work together to decide how to improve the learning processes of the student. In other words, the purpose should be for teacher and student to decide what to do next.

This wisdom originates with the teachings of L. S. Vygotski.¹⁴ and should be the guide to all teachers.

¹⁴L. S. Vygotski has been almost unknown to educators in the West until the 1970s. Vygotski worked in the former Soviet Union, teaching learning disabled children. See Thought and

The matrix of objectives should be discussed with the students at the beginning of the course of instruction and for each row of the matrix, an agreement should be developed between students and teacher concerning their obligations to each other.

The students need the following information:

Why the topic is important to them. This may require students to do some fact finding, for example, by interviewing adults in their family, or older friends or professionals in a field. It is not a good idea to say, "You must learn this because I say so" or "You will need it later. Trust me." The students should organize their findings, using an affinity diagram. This might well be the first time they learn to use such a diagram.¹⁵

The levels of competence to be attained. In defining a level it is important to describe the process whereby the level of competence is to be attained. This requires describing:

- What the teacher is expected to do.
- What the student is expected to do.
- How the student will know when each level has been attained.
- How the teacher will know when each level has been attained.
- How the teacher and learner are to document this level of attainment to third parties.
- How the student may self-evaluate progress and be prepared to discuss progress with the teacher.

Depending on the ages of the students, levels of achievement and learning objectives will be the subject of negotiation. Of course some objectives and levels may be beyond negotiation, as for example the admission requirements of a University or licensing requirements for a profession. Very young students will have much less to say about these objectives than older students.

On the other hand, all students, at all ages, should be involved in a discussion of the importance of the learning objectives and the learning processes. Even though the discussions at the level of the first grade will require considerable guidance from the teacher, by the time the students have reached the fourth or fifth grades, they will be more capable and will have become habituated to taking a proactive role in their own education. They will have learned a great deal about themselves and how they learn best and will be on the road to becoming autonomous team players.

What about reward systems for teachers?

This is not the only area in which, especially during the transformation of the culture, that teachers will find that it is the system which prevents improvement. This is especially hard on the pioneers. There are two lessons we can draw from the experiences of those pioneers who have already made a start. They did so in spite of, not because of the reward system.

Try, persistently, to interest the top management in what you are doing.

"Network" with other teachers in your school and your district.

Language by L. S. Vygotski, translated and edited by Alex Kozulin, MIT Press, 1986. ISBN 0 262 22029 6.

¹⁵ When introducing any quality improvement tool or technique, do so in connection with a task or problem the students want to solve anyway. These tools should never be taught in connection with problems of no interest to the students.

Draw the parents of your students into the classroom work. For example, when you teach quality improvement tools to your students, ask them to ask their parents if they are learning these tools, too, at their place of work. If you have 25 students, the odds are very great, today, that some of the parents are involved in quality improvement. Invite them to come to school and talk with the students about what you are doing. In politics this is called "building a constituency", which I can assure you is a useful thing to have.

In general, even though they spend less time studying the material of the syllabus, the students of the "pioneers" have generally fared, on the standard tests, as well or better than the other students.¹⁶ If you are still stuck in a school district where people "teach to the test", then you should discuss this openly with your students and decide what to do about it. Tackle this as a class task, with the objective of being able to take the tests without letting them disrupt the educational process.

While you are fretting about the discrepancy between the reward system and what makes for you to do a better job, think again about the reward system you have set up for the students. Does it make sense to them?

Do not underestimate the value of the quality management tools in increasing the effectiveness of the time your students spend on learning. Don't try to teach all the tools to your students. Let them teach some of them to you! David Langford has compiled a list of about 37 tools, and gives them out as part of his seminars, but for most purposes only about 7 of these tools will do for most problem solving and only about 7 more for problem formulation. Each tool is simple and can be understood in about an hour. However, it takes some practice to become skilled with them. It is easy to go to the first level of knowledge with each tool. It takes some experience with applications to get to level 2 of know-how.

An interesting contribution from quality management has been the development of tools and techniques to help groups of people to define the problem on which they should work. Most of us have been taught how to solve a "given" problem. We have been left pretty much to our own devices in learning how to figure out what problem we should solve. When teams of people are asked to solve a problem, it often takes an inordinate amount of time for them to learn to work together. Without special training, they do not have the tools required to agree on what they are doing, prioritize their efforts, gather and analyze the data, propose a plan of action and demonstrate that it leads to the desired result.

We visualize groups of students working on the improvement of their educational processes, such as conduct of classes, preparation of homework, selection of projects, evaluation of performance, and the establishment of standards of excellence. If they are to work in teams, they need to understand methods of *group problem solving*. This, too, is a paradigm shift because everyone, including teachers, has been taught that working together is a form of "cheating".

It is in group problem solving exercises that teachers can become coaches and begin to help young people develop wisdom and character.¹⁷ The shift from teacher to coach is a subtle change but is essential to the development of autonomy.

¹⁶ They have complained, bitterly, however, that these tests did not allow them to show what they have truly learned, but were limited to only one aspect of their education.

¹⁷ My visits to schools from Kindergarten to University have made it clear to me that at the lower levels, teachers are very much concerned with character development but at the University, only the athletic coaches seem to care about character. Furthermore, if the sport

Quality improvement projects, carried out by teams of students, can provide a basis for learning quality improvement methods, team problem solving, and, of course, the fundamental aspects of whatever subject is used in the improvement process. At the same time, the students can be helped to analyze their own behavior patterns and to comment upon the quality of their own character.

At the level of the second grade, Theresa Hicks has involved her students (ages 8 to 9) in discussions of how to judge good character and had them develop examples of good and bad character they had observed in themselves and others.

In a seventh grade Spanish class, the students undertook to write Spanish translations of articles on quality so that Hispanic workers in nearby factories would have useful references. When they got together in teams and defined what it meant to make an excellent translation, they realized they could not do it alone and that for the team effort to succeed, everyone had to help everyone else.¹⁸

The students in Sitka, Alaska, developed the phrase, "If it isn't perfect, it isn't done". I found it on posters and blackboards all over the school. (In English, Japanese and Russian, the obligatory languages for all students.)

OK. But When and How do I Begin?

No Organization
No Coordination



When asked "When should I begin?", Dr. Deming has been heard to say, "It doesn't matter, so long as you start at once."

How to begin depends on where you are. If you are a principal or a superintendent, what you should do is much different than if you are a teacher in a classroom. Furthermore, if you are a teacher, a great deal depends upon whether the principal and other people in administration are supportive or not. Both cases need to be considered.

Most of us have been taught, especially in college, that we need to have certain requisite knowledge before we try to do something. It is not true for most things in life. If your parents had believed that, most of you would not have been born. This myth has led to a sort of educated incapacitance. People without the "advantage" of a college education are often observed to just start to do something and to learn from their experience while educated people look around for a college credit course to take. The systems in which they work have made failure very expensive, so they want to obtain educational insurance.

**You do not have to know everything
Before you try to do anything.**

involves teamwork, character development becomes of concern to all the players, not just the coach.

¹⁸ The teacher, Carol Scott Scozzafava, of Moraga, California reported that after the students realized what had to be done to provide a high quality translation, they told her they could not do it within the normal class period but instead met for several Saturdays in a row so they could devote large blocks of time to the work.

You do need a minimum body of knowledge to start. Most of this knowledge can be obtained from reading, by attendance at a few lectures and from discussions with a consultant.¹⁹ Do not be afraid to try your knowledge in the classroom and raise your level of competence to "Know-How", level 2.

Starting from the Bottom--the Hard Way.

If you are a teacher or a principal, one of the first things you can do is to copy the competency matrix shown in the appendix and use it for a self assessment of your current state of competency. For each row, using a colored marker, indicate the level of competence you think you have already attained. Then with this evaluation as a guide, plan a reading program to make sure you have at least reached the first level of knowledge in all the subjects.

If you form a team with some other teachers, you and they can get together and see who might be more advanced in a topic or could use help. You can teach each other. Using the competency matrix as a guide, you can organize your own learning approach, cooperating with others to minimize the effort and time required.

At the same time, for the subject you expect to teach, you can begin to develop the competency matrix you want your students to follow.

**If you share with your students your
competency matrix, and your own evaluation,
and if at the same time your students discuss
with you the matrix you and they prepared together
for their education, you are already on the way.**

You and the students are learning together.

What Do I Do if the Principal is Not Actively Involved but only Gives Lip Service.

This is often a valid complaint, but it also can cover up a disinclination to make the necessary changes by placing the blame on the school Principal. My advice to you is simple:

**Sometimes you have to forget your principals
and do the right thing!**

The principal's role is critical, but even when the principal does not act, all is not lost. We have several examples of teachers who simply started working in a quality way when their principal not only was not sympathetic, but even hostile. It takes a great deal of courage to persevere. On the other hand, the performance of the students usually shows such a dramatic improvement that the administration and parents can be won over.

¹⁹ I have found, and so have most consultants, that in every company in which a start has been made on quality management, there are people so excited by the potential of this way to manage that they are eager to share their knowledge with others. Be on the lookout for these "evangelists" for they can be of immense help, even if their companies will not lend them outright. Start by asking your students how many of their parents are involved in quality management at the place of work. Then invite some of them in to help you.

If you are not using the personal check list and have not prepared your own competency matrix, and if you are not already involving your students, you have no right to complain about the inactivity of the principal.

How to deal with reluctant management is also a big problem in industry and I shall not dwell on it here.²⁰

Self Improvement Is Always a Good Idea, But It Hardly Sounds Like the Sort of Thing I Heard About the Successes of Quality Management

Right. It is only one small step. Another important step comes when teams are formed to improve something of importance to the school. These teams should be of two types:

Student teams, coached by a teacher, working on problems of importance to the students.

The list of potential problems is endless. It is a good idea to let the students choose the topic, with the concurrence of the teacher.

The first projects should be concerned with problems which arise in the class room, such as a) Starting on time, or b) Homework assignments missed. Schoolwide problems may also be undertaken, such as a) traffic in the hallways, b) cleanliness around the school, c) safety at recess or d) adjustments to class schedule to permit more intensive study²¹.

"Crossfunctional" teams, involving teachers, administrators and the principal (with students where appropriate), working on tasks which cut across different departments within the school. These may involve problems associated with supplies, purchasing, transportation, safety, crowd control, etc.

Some teachers may be reluctant to involve students in administrative matters, but they should remember that today students are apt to be more proficient with computers than the faculty and can be very helpful in gathering data, entering the data on spread sheets, developing analyses and presenting the results in graphical form. We have had the experience of high school students with about a year's worth of experience in quality improvement techniques, outperforming executives in a nearby factory!

Starting from the top--Easier but never Easy.

Consider the happier situation in which the superintendent has indicated a desire to learn how to apply quality management to the running of a school and is interested in cooperating with the

²⁰ Tribus, Myron "My CEO Does Not Understand Quality: So What Can I Do To Save the Company" National Productivity Review, Winter 1991/92. Pg. 305-308

This article describes strategies for changing the enterprise from the bottom up rather than from the top down. It works sometimes, but unless and until the top management understands the need to change and gets wholeheartedly behind it, the resulting improvement will be very limited. In schools, however, the students often become agents of change and are unstoppable.

²¹ The students at Mt. Edgecumbe High School in Sitka persuaded the faculty to change the schedule so they had more time in each class and could, therefore, undertake more intensive projects.

teachers to do so. The following remarks are directed to these superintendents. They are a treasured national resource.

Follow the slogan--It Begins With Me

If you are the leader, then lead by example. Master the basic ideas of quality management. For this purpose, you will need a consultant. Today most communities are fortunate to contain at least one company which is involved with quality management. These companies usually are willing and interested to help schools. Call upon a nearby company to supply someone as a personal consultant or ask them to lend you some of the time of one of their consultants.

The superintendent, with the help of the consultant, should develop a competency matrix for the superintendent's job. It will take several days, perhaps a month, to develop the matrix and to develop definitions of levels of competence. The competency matrix in the appendix can be used as a starting point. If you are lucky, your consultant will know most of the items in the list and can help you do some reading. Today the American Association of School Administrators provides seminars, good reading matter and a newsletter. These will permit you to connect with other school administrators on the same path.

The superintendent and the consultant should develop their own definitions of levels of competence and develop a profile of the superintendent's current capabilities. It helps to pretend that the superintendent is developing a check list for candidates to be the next superintendent. This profile, a self assessment, defines things to be learned. Remember, "The only things you can learn are the things you do not already know."

The superintendent should develop a portfolio to back up any claims to competency at a particular level. The support for a level of competence may take one of several forms:

- Documentation in the form of a report, a paper, a certificate of accomplishment.
- A "defense" in the form of a presentation.
- The results of a written examination.

Remember the purpose of the portfolio is not to grade or rank a person. It is to identify what that person needs to do next to become better in the job. Most people will prefer to keep their portfolios private until they have compiled a record of which to be proud. Meeting with a few teachers who have indicated their interest in quality, the superintendent can exchange matrices with them.

**At this point, the learning community
will have started to operate.**

The learning community is characterized by:

- People teaching one another.**
- Fact based evaluation.**
- The search for improvement.**
- The involvement of everyone.**

It will be recognized that the first step in the learning community is directed at self improvement.

What Form of Organization is Best?

This question has no unique answer. Many schools are working in different ways. Based on my experience in industry, it is probably a good idea to form a steering committee. Call it the "Improvement Committee" or some non-descript name. Appoint to the committee representatives of various constituencies in the school, such as Teachers, Department Heads, Administration, Maintenance, Students and, perhaps, the Union. The purpose should be to consider what are the most troublesome issues in the school and what to do about them.²² The teachers should be encouraged to identify problems which arise when they are trying to introduce quality methods in their classes after which others should present their candidates for improvement. This committee should be taught the methods of quality management, especially techniques associated with creating effective meetings.

Once a steering committee has been formed and significant problems identified, it may be desirable to form subcommittees to work on special tasks.

There is one principle which should be observed when forming these organizational entities.

**Do Not Allow a Committee to Work on Important Problems
Unless the Members of the Committee have been Trained
In Quality Management Techniques.
If the Old Methods Had Been Adequate To Solve Them
These Problems Would Have Been Solved Already**

CONCLUSION

Every superintendent in every district, every principal in every school and every teacher in every class in America can start now, at once, to introduce quality management in the classroom. Every principal can work with the teachers to help them work together and build upon one another's efforts. They do not need anyone's permission. They do not need more money, either, for the schools where it has been tried most successfully did not have additional funding to get started.

There are people in industry who are eager to help. What is required is an initiative on your part. You need to decide that you have something to learn. You need to decide to learn. You need to decide to apply what you learn. You need to do it, and you need to do it now.

²² Recent court rulings have made it clear that the committee should NOT discuss topics which belong to labor management negotiations.

Competency Matrix for a person to teach quality methods.

		COMPETENCIES TO BE DEVELOPED		KNOWLEDGE		KNOW-HOW		WISDOM	
		(and the levels to be attained)		L1	L2	L1	L2	L1	L2
ABILITY TO TEACH QUALITY METHODS	HISTORY OF QUALITY	EFFECTS							
		GLOBAL ECONOMY							
		JAPAN							
		PROCESS ORIENTATION							
		RESULTS ORIENTATION							
		SHEWHART/DEMING/JURAN/ETC.							
		SUCSESSES							
		UNITED STATES							
	FACILITATION SKILLS	KNOWLEDGE							
		LAGTIME							
		LEADERSHIP							
		MANAGE(ORGANIZE, CONTROL) RESOURCES							
	KNOWLEDGE OF PSYCHOLOGY	ATTITUDES							
		EXTRINSIC MOTIVATION							
INTERACTION									
INTRINSIC MOTIVATION									
LEADERSHIP									
LEARNING PROCESS									
	PEOPLE DIFFERENCES								
	PROACTIVE								
	SHARPEN THE SAW								
	SYNERGY								
	TEAMS								
	UNDERSTANDING WIN/WIN								
UNDERSTAND PARADIGMS	CHARACTERISTICS								
	DEFINITIONS								
	DRIVING								
	EFFECTS								
	EVOLUTION								
	FUTURE								
	GOING BACK TO ZERO								
	PAST								
	PIONEERS								
	PREVENTING								
SHIFTS									

Competency Matrix (cont'd)

COMPETENCIES TO BE DEVELOPED		KNOWLEDGE		KNOW-HOW		WISDOM	
		L1	L2	L1	L2	L1	L2
(and the levels to be attained)		L1	L2	L1	L2	L1	L2
AFFINITY DIAGRAM							
AREA CHART							
BAR GRAPH							
BRAINSTORMING							
BUBBLE CHART							
CHECK SHEET							
COLUMN CHART							
COMPETENCY MATRIX							
CONSENSOGRAM							
CORRELATION CHART							
DEPLOYMENT FLOW CHART							
FISHBONE							
FLOW CHART							
FLOW TREE DIAGRAM							
FORCE FIELD ANALYSIS							
FREQUENCY/HISTOGRAM							
GANTT CHART							
IMAGINEERING							
INTEGRATIVE ANALYSIS							
ABILITY TO TEACH QUALITY METHODS	USE	INTERRELATIONSHIP					
	QUALITY IMPROVEMENT TOOLS	LEARNING CHART					
LOSS FUNCTION							
LOTUS DIAGRAM							
MATRICES							
MULTI-VOTING							
NOMINAL GROUP TECHNIQUE							
OPERATIONAL DEFINITIONS							
PARETO CHART							
P.E.R.T. CHART							
PIE CHART							
PILOT PROJECT							
PDPC							
RUN CHART							
SAMPLING							
SPIDER DIAGRAM							
SURVEY							
SYSTEMS PROGRESS							
VISION							

Competency Matrix (Cont'd)

		KNOWLEDGE		KNOW-HOW		WISDOM	
		L1	L2	L1	L2	L1	L2
		COMPETENCIES TO BE DEVELOPED					
		(and the levels to be attained)					
ABILITY TO TEACH QUALITY METHODS	APPRECIATION FOR A SYSTEM	ACTIVITY NETWORK DIAGRAM					
		COMMON CAUSE					
		COMMUNICATION					
		COOPERATION					
		DEPENDENCE					
		INDEPENDENCE					
		INTER DEPENDENCE					
		MANAGEMENT					
		OPTIMIZATION					
		PLAN, DO, STUDY, ACT					
	THEORY OF KNOWLEDGE	PROCESS CAPABILITY					
		PROCESS MISTAKES					
		RANDOM FORCES/CHANGES					
		SPECIAL CAUSES					
		STABLE SYSTEMS					
		VARIATION					
		WHAT IS A SYSTEM					
		COMMUNICATION					
		EXAMPLES					
EXPERIENCE							
BUILDING TRUST	INTERPRETATION OF DATA						
	OBSERVATION/INSPECTION						
	PREDICTION						
	PROFOUND KNOWLEDGE						
	SPECIFICATION LIMITS						
	SOURCES OF UNCERTAINTY						
	TAMPERING						
BUILDING TRUST	THEORY OF FAILURE						
	TRUE VALUE/FACT						
	VARIATION						
	ACTIVITIES						
	COMPETITION						
	COOPERATION						
BUILDING TRUST	EQUALITY						
	INFLUENCES						
	RESPECT						
	SUPPORT/COACHING						

Competency Matrix (Cont'd)

		COMPETENCIES TO BE DEVELOPED		KNOWLEDGE		KNOW-HOW		WISDOM	
		(and the levels to be attained)		L1	L2	L1	L2	L1	L2
ABILITY TO TEACH QUALITY METHODS	BRAIN RESEARCH AND THEORY	AFFECTIVE							
		COGNITIVE							
		INTUITIVE							
		LEARNING STYLES							
		NEURONS							
		PHYSICAL							
		TAXON MEMORY							
		LOCALE MEMORY							
		BRAIN-BASED LEARNING							
		THEMATIC TEACHING/LEARNING							
		NEUROSCIENCE							
		INTRINSIC MOTIVATION							
		EXTRINSIC MOTIVATION							
		TEAM BUILDING	COLLEAGUES						
	CUSTOMERS								
	FOCUS/VISION								
	GOALS								
	PURPOSE								
	REINFORCEMENT								
	SUPPLIER								
	TRUST								
	TECHNOLOGY	AUDIO VISUAL							
		COMMUNICATION							
		GLOBAL INFLUENCE							
		HARDWARE/SOFTWARE							
		PROS/CONS							

APPENDIX II

AN ANNOTATED READING LIST
SUITABLE FOR TEACHERS

By the time you read this list, it will probably be out of date. The quality movement plus the renewed interest in education has spawned a new industry--writing books on quality in education.

Brassard, Michael, The Memory Jogger and The Memory Jogger Plus GOAL/QPC, 13 Branch Street, Methuen, MA 01844 Phone: (508) 685 3900 FAX: (508) 685 6151

These books are also available in a version written for teachers and students. They contain descriptions of various tools and techniques useful in problem solving, organizing groups to solve problems and in problem formulation. A must for any teacher serious about quality.

Covey, Stephen R. The 7 Habits of Highly Effective People Simon and Schuster, (1989)

A very stimulating book dealing with self improvement. Available in paperback. Potentially a textbook for high school students but can be used at any level.

Deming, W. Edwards, Out of the Crisis MIT Center for Advanced Engineering Study (1982)

Although aimed at industry and government, this book has an excellent treatment of the foibles and failures of management as practiced in major corporations in the USA. Regrettably, although it is eleven years old, it is still pretty much on the mark. It is well worth reading for the cultural value for it is considered a classic in the field.

Deming, W. Edwards, The New Economics for Industry, Government and Education MIT Center for Advanced Engineering Study (1993)

This book extends and elaborates on ideas presented in Out of The Crisis. Contains many anecdotes useful in driving home his many points about what must change in our present style of management. A few references to education, but many general principles to provoke your mind.

Dennett, Daniel C., Consciousness Explained Little Brown (1991)

This book was on the New York Times list of the ten best books of 1991. Despite its technical content, it is thoroughly readable by non-experts in the field. A good complement to Jane Healy's book.

Dobyns, Lloyd and Crawford-Mason, Clare Quality or Else Houghton Mifflin (1991)

This book is a companion to the PBS three hour series with the same title. While mostly about business, there are several examples taken from education. The videotapes should be available from a local PBS station but it may take some digging to get them.

Healy, Jane M., Ph.D. Endangered Minds: Why Children Don't Think and What We Can Do About It Touchstone Press, Simon and Schuster, 1990

A review of the neurophysiology of brain development and the effect of early childhood experiences in the development of linkages within the brain. This is a hopeful book based on factual information.

Schargel, Franklin P. Transforming Education Through Total Quality Management, A Practitioner's guide Eye on Education, P.O. Box 388, Princeton Junction NJ 08550 (609) 799 9188

This is the first book written by someone who has actually practiced what so many other people are preaching! The book is written in a fast, New Yorker style, easy to read and honest about what worked and what didn't. High useful for people who want to get started and are afraid to begin.

Scholtes, Peter R., Editor, The Team Handbook Joiner Associates, Inc., 3800 Regent Street, Madison, WI 53705-0445

Phone: (608) 238 8134 FAX: (608) 238 2908

*This book is also available in a version written for educators. It contains practical instruction for forming groups, for organizing them to solve problems and for problem analysis. **This book is a required reading for any teacher serious about quality.***

APPENDIX III
A Personal Quality Check List

A useful tool which everyone can use to advantage has been devised by Professor Harry V. Roberts of the University of Chicago Graduate School of Business.²³ The definitions and categories shown by Professor Roberts in the following check list may not be appropriate for you. Make up your own, and, if possible, do so in cooperation with other teachers and administrators.

Have your students make up a checklist appropriate to themselves. Compare records of performance and see if paying attention to these minor deficiencies improves performance over time.

Harry Robert's Personal Quality Check List

Week of _____

Defect Category	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total
Late to meeting or appointment								
Search for some-thing misplaced or lost								
Delayed return of telephone call or reply to letter.								
Put a small task into a "hold" pile.								
Fail to discard junk mail promptly.								
Miss a chance to clean the office.								
Unnecessary inspection								
Total defect today								

Check marks indicate flawed behavior. Sum the number of check marks by rows and columns. Plot the data as a run chart.

Professor Roberts gives these definitions:

- Late for meeting or appointment includes being late by even one second. Always carry background reading or work materials in case others are late.
- Searching for something misplaced or lost, more than momentarily confused about the location of an important document, a book, an address or working materials. Includes forgetting a task or working material.
- Delaying return of telephone call or reply to letter. Failure to act at the first opportunity. If a lengthy reply to a letter is required, a short acknowledgment should be made at once.
- Putting a small task in a hold pile when it can be done quickly now. A hold pile (work in process) seems unavoidable, but must be kept small and attacked continually. One important small task is filing.

²³ Roberts, Harry V. "Using Personal Checklists to Facilitate TQM", Quality Progress, June 1993, Pgs. 51-56.

- Failing to discard incoming junk mail promptly, to act on first reading or skimming of written materials. In case of doubt, have a hold in-case pile that is periodically screened, quickly and discarded.
- Missing a chance to clean office. Burdened with decades of accumulated junk. With due diligence, much may be discarded.
- Unnecessary inspection. Checking on something done, but done without care and diligence so that the task is done at least twice.

Roberts cites an example at AT&T where a vice president started the habit of using a checklist for his own activities, shared the results with his subordinates and got them to do likewise. In a few months employees started to develop their own personal checklists, to compare them with one another and to help one another by sharing "tricks" they had developed to increase their self discipline. Sergesetter says that the result has been to free up at least one hour per day of extra time for him, to increase discipline at meetings (they now start on time) and to reduce the number of errors.

What Has This Check List to Do With Improving the School?

First of all, using such a check list will show you how to recover time you didn't know you were wasting. Try it. You should not say it won't work for you if you don't try it.

Secondly, all teachers are examples of how to behave. If they act in an undisciplined manner, then their students will learn that self discipline does not matter. If you want people to strive for excellence, then you must do so, yourself. You cannot do this if you are not in control of yourself.

Improvement begins with you