EFFECTS OF THE IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT ON THE RAPPAHANNOCK COUNTY, VIRGINIA PUBLIC SCHOOLS

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(ABSTRACT)

In May 1993, 795 school district associates, students, and parents participated in a study to determine whether the implementation of TQM from 1990 to 1993 has made fundamental and significant changes and improvements in the district.

In 1990-91, senior management of the district received 80+ hours of training and were certified as Quality Trainers by the Xerox Corporation and the Virginia Department of Education through a US Department of Education partnership grant. By September 1992, nearly 90% of all Rappahannock school district associates (employees) had received 30+ hours of training in quality management. The Xerox model of training includes components on defining quality, meeting needs of customers, interactive skills, working in teams, problem solving, and a quality improvement process.

Over 60% of associates volunteered to serve on quality teams to address concerns targeted by customer surveys. In 1992-93, all associates served on required quality teams to improve instruction and support services. A couple of elementary school quality teams reduced numbers of students needing math

remedial pullout services by 35% to 40%. The high school math team devised an improved process for team-teaching math and quality problem solving. Bus drivers, parents, teachers, administrators, and students served on a quality team to reduce 34% parent dissatisfaction with transportation services to 11%.

The study found that since the 1990 introduction of TQM in the district: 89% of associates are using aspects of the quality training in their work with others; 72% of associates feel that administrators have increased their efforts to meet their needs; 66% of associates feel more empowered; 78% of students identify things that have improved; and 79% of parents feel that the schools have increased their efforts to meet their childrens' needs.

A "quality customer service in education" (QCSIE) scale was devised from the student survey items and responses. Seventy-eight percent of the district's students have positive QCSIE scores. The QCSIE scale can be used to help schools determine the level of student satisfaction with educational and support services. A similar scale found that 88% of students have a willingness to help produce, or coproduce their education.

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Public education in the United States is at a crossroads. Many view the public schools that were conceived in the last quarter of the 19th century as being near death in the waning years of the 20th century. Constant changes in the political, social, and economic environment have taken their toll on schools and students. 1) *Brown v Topeka Board of Education* (1954) ushered in an era of forced desegregation of previously racially segregated schools that ultimately resulted in many children being bused away from their neighborhood schools to achieve racial balance. 2) *Engel v. Vitale* (1961) was the first of many Supreme Court decisions that upheld the U.S. Constitution's 1st Amendment prohibition against prayer in schools. Although constitutionally correct, the decisions removed religion as a values medium from those public schools that chose to comply.
3) Schools were consolidated to modernize structures and curriculua, but resulted in the elimination of numerous small closeknit, community-oriented schools.
4) Increased student use of alcohol and controlled substances affected the readiness and willingness of some young minds for learning. 5) Increases in single parent and two-income families reduced opportunities for direct parental supervision and guidance of their young.

With the 21st century on the horizon, conservative politicians are touting educational vouchers for families to send their children to the public or private schools of their own choice. The use of tax funds for parents to spend in an educational marketplace threatens to break the alleged public school monopoly and eliminate those schools that can't compete. Even without a fullfledged voucher system, some families are removing their children from public education to place them in private schools, provide home instruction, or seek religious exemptions from compulsory attendance.

Education reform reports of the 1980's, while largely ignoring the causal nature of a deteriorating social environment, were highly critical of an education system whose students' achievement levels allegedly ranked below several other industrialized nations. From the perspective of many of America's politicians, academicians, and business leaders, American public education deserves the traditional definition of "Made in Japan" : poor quality and cheap. With few exceptions, the reform reports' solutions seemed to be more quantitative than qualitative. And there were few commonalities among them.

Learning a Living: A Blueprint for High Performance. SCANS Report for America 2000 (U.S. Labor Department, 1992) is the most recent educational reform document in the decade long stream of criticism of elementary and secondary education. SCANS, the U.S. Labor Department's contribution to educational reform, is the first document produced by the American government that addresses in specific detail how public education should be changed to prepare students for the workplace of the 21st century.

Among its strongest recommendations: "The nation's schools must be transformed into high performance organizations" the trait that characterizes our most competitive companies. SCANS challenged school administrators to "try to apply the 14 points of W. Edwards Deming, the man whose ideas produced the Japanese economic miracle and the redirection of American businesses toward quality as the touchstone for productivity growth" (U.S. Labor Department, 1992, p. 17, and Deming, 1986).

By the late 1980's a few United States school districts had begun to explore the use of TQM as a process to improve public education. The Sacramento County School District professes to be the first to implement TQM in K-12 public education

"organization-wide" in 1986 (Meaney, 1991). Sacramento County is actually an intermediate service district that provides overall administration for 16 districts, plus centralized vocational education and special education services.

In 1987, National Westminster Bank USA provided training for the faculty of Brooklyn's Westinghouse Vocational High School to implement quality (Schargel, 1987). Leaders at Mt. Edgecombe Vocational High School in Sitka, Alaska, trained students in quality improvement strategies they had learned at Deming seminars (Tribus, 1990). In 1989 Xerox Corporation's C.E.O., David Kearns, facilitated the development of a partnership with the Virginia Department of Education to explore a pilot implementation of Quality Management in three public school districts. With additional U.S. Department of Education partnership grant funds, the Xerox/Virginia Department of Education effort was expanded in 1991 to eight Virginia school districts including the Rappahannock County Public Schools (VSEN, 1992).

Increasing numbers of America's public school districts are looking to Total Quality Management (TQM), as espoused by Deming and others, to improve their services to "customers." By 1993, more than 100 school districts nationwide had started implementing some form of TQM. The American Association of School Administrators (A.A.S.A.) formed a Quality Network in June 1991. Almost 400 public school districts have representitives in the network (1992).

There is great variation in the content and length of TQM training for educators. Some school systems provide as little as a checklist on how their schools' operationalize Deming's 14 Points. Other districts offer a partial day inservice titled "Introduction to Quality." Still others provide 30 + hours of quality

training.

Likewise, there is considerable variation in the way TQM is implemented in schools across the country. Eighty percent of the districts reported using quality tools to improve administrative services, 50% to improve teaching methods, and 50% to increase student achievement (Horine, 1993 p. 33). Some use quality to try to improve all aspects of the system. Many rely on ad hoc project teams to solve problems as they are detected. Still others mandate that all associates serve on standing problem solving or quality improvement teams to improve instruction.

Rappahannock County, Virginia's Superintendent Dr. David Gangel informed the American Association of School Administrators' (AASA) Quality Network participants in the summer of 1991 that his district had begun training all associates: teachers, counselors, librarians, bus drivers, secretary-bookkeepers, custodians, cafeteria workers, and instructional leaders with a 30+ hour intensive course in quality management . The training is patterned after that used by the Xerox Corporation to train its employees in quality. Gangel's vision is that the total operation of the school system ranging from educational to support services be run in the continuous improvement / customer service format of Quality.

This would be a drastic change for the Rappahannock County Public Schools, a small rural district nestled against the eastern slopes of the Blue Ridge Mountans near the Shenandoah National Park's Skyline Drive. About 1,000 of its 6,600 residents are students. Another 1,100+ are their parents: orchardists, farm hands, artists, textile workers in the only factory, associates in the mail order plant, and professional or skilled workers who commute "down the country" towards Washington, D.C. for work.

Seventy five teachers ply their instructional skills. There are 3 counselors,

13 teacher aides, 4 secretaries, 1 finance director/bookkeeper, 21 bus drivers, 2 mechanics, 3 RJR-Nabisco "Next Century Schools" grant personnel, 5 "safe haven" drop-out prevention personnel, 6 custodians, 12 cafeteria personnel, and 8 instructional leaders. In 1989, none of the above expected to be treating students and parents like customers.

The first phase of implementing Quality in Rappahannock County involved preparation for training. Four school division employees including the superintendent, assistant superintendent, and two teachers went through the equivalent of 80 hours of coursework at the Xerox Training Center in Leesburg, Virginia to become Quality Trainers. Each was credentialed to teach the 30+ hour training segment entitled "New Employee Quality Training" (Xerox, 1986). New Employee Quality Training (NEQT) consists of training modules in:

a) What is Quality;

b) Importance of serving customers / meeting customer requirements;

c) Using Interactive Skills: initiating, reacting, and clarifying;

d) Using a team and data-oriented Problem Solving Process with these steps:

- Identify the problem and state problem in "as-is" and "desired state" formats,
- Collect relevant data, analyze the data / problem, restate problem if necessary
- Generate solutions,
- Select / plan solutions,
- Implement solutions
- Evaluate solutions;

e) Using a Quality Improvement Process:

- Identify the output and the customer who will receive it,
- Identify customer requirements and translate into specifications,
- Identify steps in the work process,
- Select measurements for measuring quality,
- Determine process capability of revised work process,

•Evaluate results, and re-cycle.

Rappahannock's administration decided to make TQM training voluntary at the outset to increase associate (employee) "buy-in" to the revolutionary concept. Over 65% of Rappahannock school associates volunteered for the training which started June of 1991. In August 1992 the Superintendent and Assistant Superintendent completed 30 hour training sessions with new hires and with those returning associates who did not volunteer for the training. By September 1, 1992, nearly 90% of all school division associates (classified and certificated) had received the 30 hour training.

During the summer of 1991 a Quality Steering Committee was formed, a mission statement developed, and an implementation plan approved by the school board (Gangel, 1991). The Steering Committee designed "customer surveys" (Appendix A) for parents to fill out at fee day before the start of the school year. Responses were sought from parents concerning their perceptions of the effectiveness of the schools' instructional program, guidance services, administrative services, degree of fairness in handling discipline, transportation services, etc. The Quality Steering Committee also sought recommendations from associates of problems they would like to have solved.

To address the problems identified by parents and associates, the steering committee set up "cross-functional" Quality problem solving project teams comprised of volunteer school associates, administrators, parents, community members, and a few students. The project teams were formed to address:

Parent satisfaction with the transportation system
Elementary school schedule compatibility with whole language
The primary grades' reporting instrument
High school discipline
Elementary school building security
Computerization and student achievement

Leave policy for 10 and 11 month employees
Student emergency / diagnosis procedures
Building expansion

Problem solving teams are asked to follow the six step problem solving process learned in training. The process fosters a scientific method-like approach to improvement. By identifying a problem in an "as-is" and "desired state" format (See figure 1), a gap is identified. Whatever solutions the team selects are expected to help close the gap. The solution is, in a sense, a hypothesis of what it might take to close the gap. Once the solution is implemented and measures are taken to evaluate the outcome, a crude form of research to determine the effectiveness of the hypothesis has taken place.

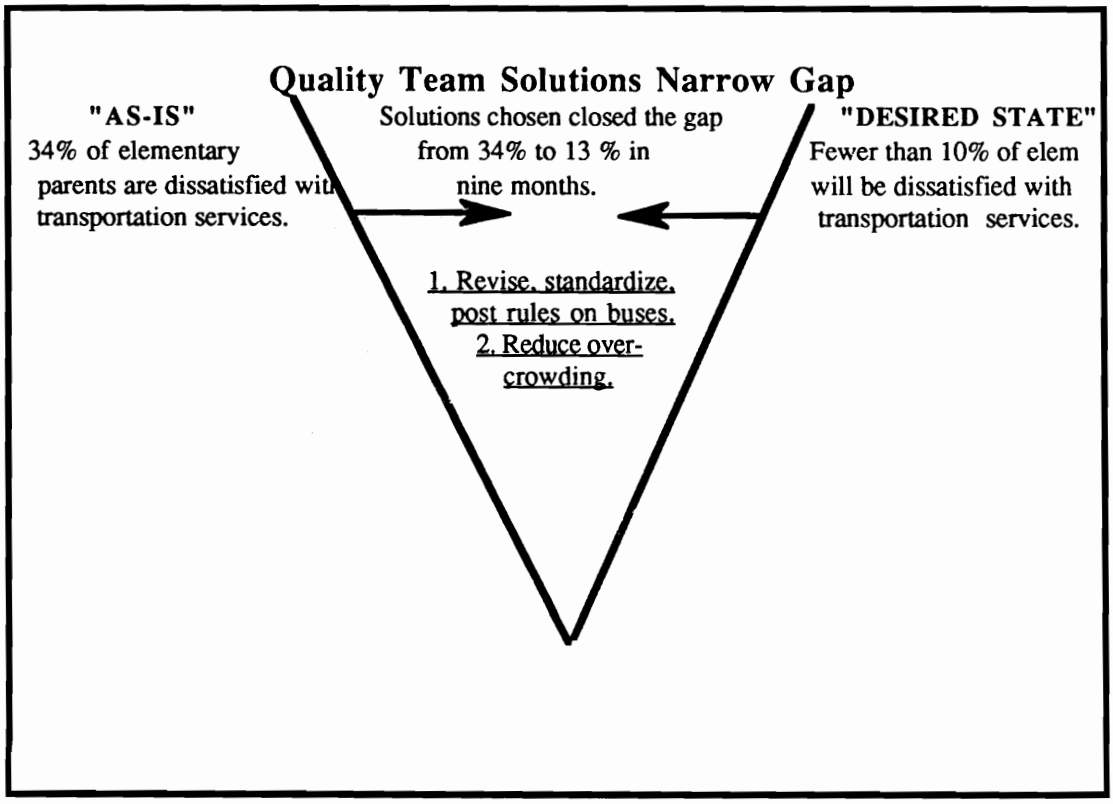

Figure 1. Quality problem solving team composed of parents, teachers, drivers, students, and administrators worked together to solve a problem no segment could have solved by itself.

During an administrative staff retreat at M.B.N.A., a financial instutition that practices the TQM philosophy, the superintendent and other instructional leaders used the 1992 Baldridge Award criteria to conduct an informal quality audit of the school system. The most glaring weakness noted was the lack of a strategic process for continuous improvement in the organization. To correct the deficiency, the superintendent made use of quality processes mandatory. Effective with the 1992-93 school year all Rappahannock associates started using TQM within departments and grade levels to improve already solid instructional and support services.

Mandating use of quality teams and improvement processes was a difficult decision. However, it was felt that mandated quality would help 100% of associates become fluent in quality improvement strategies. It was also seen as the only way to focus improvement efforts on the instructional process.

By November 1992, many of these required quality teams had begun efforts to improve instructional processes and to devise more frequent criterion referenced measures of the effectiveness of these services. Other required teams, however, foundered and had little to show for their efforts. Several months into the process, the Superintendent's staff decided to provide a centralized quality faclitator to assist all required quality improvement teams to whatever degree necessary to follow the problem-solving process. The quality facilitator provided teams with a problem solving checklist (see Appendix C) The outcomes of the quality teams are listed in the "Discussion" chapter.

Evaluating TQM in schools

A fair question to ask is "how can we be certain that school districts that report implementing TQM are really doing TQM ?" Corporations may vary in their approaches to implementing TQM, but those who wish to gain recognition for their

efforts in quality must submit to a stringent evaluation. The Malcolm Baldridge Award process examines each corporate entrant on seven standardized criteria ranging from "senior executive leadership" to "customer focus and satisfaction." (U.S. Commerce Department, 1993, p. 4)

At present, there are bills before the U.S. Congress that would institute a nationwide standardized Baldridge process to assess qualitatively TQM efforts in education (Senate bill 4, House bill 820). If that happens, there will be an objective process to evaluate whether applicant school districts really are fashioning customer-driven services and procedures.

The U.S. Commerce Department's Director of Quality Programs Kurt W. Reimann participated in a forum with the Rappahannock school district's administrative team. Reimann, the administrative head of the Baldridge National Quality Award effort, told the group that he anticipates Baldridge-in-education legislation may win congressional approval. As a prelude to developing Baldridge Award criteria for education, Reimann probed the educators for evidence about the depth of infusion of quality processes in the district and for ways in which the application of TQM in the education setting might differ from the corporate setting. Reimann urged the educators to identify two or three "actionable" processes or services in the district that could be changed or improved to increase retention of existing customers and attract new customers (August 1993).

From a cost of quality perspective, superintendents and principals cannot point to increases in corporate profits or to return-on-assets as evidence that quality makes a difference. However, a school district's annual market-share may be an indicator of whether TQM is making a difference. Market-share in K-12 public

education can be measured as a percentage of the total resident student population being served by a school district . Parents who feel their childrens' needs are not being met in public schools may send them to private schools or elect to provide home instruction. Students who don't like school may drop-out or purposely try to get expelled. When a district's average daily membership decreases, its share of state revenues shrinks (See Table 1).

Since there are no benchmarks in public education for evaluating TQM efforts in schools, this study will attempt to establish a standard for evaluation.

Table 1. Computing a school district's market-share

K-12 School District Market-Share

A	Total number of children age 5-19 residing within district	= 25,000
B	Number of children in A enrolled in private/parochial schools	= 1,250
C	Number of children in A receiving home instruction	= 375
D	Number of children in A dropped out	= 3,175
E	Number of children in A longterm suspended/expelled	= 250

FORMULA: $\frac{A - (\text{Sum of B,C,D,E})}{A}$ X 100 = Market-share

$\frac{25{,}000 - 5{,}050}{25{,}000} = .798$ X 100 = 79.8% of market served by district

Note: If the state share of educating a child in this district is $3,000 multiply that times the sum of B,C,D,& E (5,050 school age persons not being served) to determine lost state revenues.

$3,000 / student X 5,050 (persons not served) = $15,150,000 lost aid

The Problem

The problem to be studied is whether the change process "Total Quality Management" (TQM) being implemented in the Rappahannock County Public School system from 1990 through 1993 is changing the work processes and work attitudes of associates. What exactly has been implemented? Is there a fundamental change in the way Rappahannock's associates approach their interactions with each other (internal customers) and with students and parents (external customers) ? Also, by the end of the 1992-93 school year, what are the outcomes of two full years of implementation of TQM in the Rappahannock County Schools ?

Questions to be Answered

- Was each component of the implementation plan outlined on pages 5 - 9 above and on the Gantt chart in the Appendix (B) accomplished?
- Has TQM training / implementation made any fundamental changes in the way associates do their jobs / work with people?
- Do certificated associates who volunteered for TQM training differ from those who "were asked to undergo training" in the degree to which quality training/implementation has changed the way they do their jobs?
- Do classified associates who volunteered for training differ from those who "were asked to undergo training" in the degree to which Quality training/ implementation has changed the way they do their jobs?
- Has quality training changed the way administrators do their jobs?
- Do associates feel empowered? Is there any difference for the above groups in the degree to which they feel empowered?
- Is there any difference for the above groups in their willingness to serve internal customers (employees) and external customers (students & parents)?

- Is there any difference for the above groups in their perceptions of the degree to which they are being treated as internal customers by administration and other associates?
- Are certificated associates using quality strategies to improve instructional services to customers?
- Is there evidence that instructional services have improved as a result of use of quality strategies?
- Are classified and administrative associates using quality strategies to improve support services to internal and external customers?
- Is there evidence that support services have been improved as a result of use of quality strategies?
- To what degree do students feel they are being treated like customers? Do students feel that they have any responsibility to do quality work?
- To what degree do parents feel they are being treated like customers? Do parents feel that they have any responsibility or role in the provision of quality educational services to their children?
- Is there evidence that the market-share of customers served by the Rappahannock County Schools has increased since the inception of quality management in 1990?

Research objectives

"Qualitative / illuminative evaluation," a research method that employs naturalistic inquiry will be utilized to accomplish the study. Interviews, closed and open-ended surveys, and observation will be utilized to gather data. A Gantt Chart (appendix B) will be used to define and delineate the various aspects of training and implementation . Expected changes / outcomes will be identified to focus on points

of inquiry for instrument development.

Focus groups of 5-7 associates will be asked to answer these questions to assist with instrument development:

1. How has your work changed as a result of quality training you received?
2. How has the way you interact with internal and external customers change as a result of the training?
3. In what ways have you been treated as an internal customer by other associates?
4. How should you have changed, but didn't ?
5. What are your opinions about the implementation of quality? Are we going in the right directions? Can it work here? If there were one thing you could improve about the quality program, what would it be?

Justification

This study can be justified on several counts. 1) Four hundred (and likely many more) of the 15, 572 public school districts in America are considering whether to implement Quality Management. 2) More than 100 of these districts have started implementing TQM and perhaps have committed significant personnel hours and financial resources to do so. 3) Some of America's corporate giants: Xerox, Motorola, IBM, Westinghouse are loaning executives and donating financial resources to individual districts or consortiums of districts to implement quality. 4) The United States government has provided grant funding for some TQM-in-education partnership projects. 5) Since there are not other completed studies as of October, 1993 on the impact of TQM on a public school (K-12) system, a number of educational practitioners and partners in the world of business will be interested to find out whether quality "works" in this setting.

Theoretical base

Theoretical underpinnings for this study are found largely in the works of W. Edwards Deming and his "Fourteen Points," especially: "Establish constancy of purpose; institute training on the job; structure management to accomplish the transformation (to quality)" (1986, pages 23-24). Joseph Juran put emphasis on customer satisfaction as the focal point of an organization's work (1989). Kaoru Ishykawa instituted use of Quality Circle teams to implement quality improvement (1968). Gordon Whitaker and others in Public Administration developed the theory of "coproduction" in service organizations (1980). At the heart of the theory of coproduction is the notion that the person providing a service and the next-in-line customer receiving the service share responsibility for the quality and outcome of that service .

Historically, the practice of implementing Total Quality Management has been predominantly in corporate settings. In the business world, those who build quality into their work processes and do their jobs "right the first time" (instead of inspecting after they finish the job) save money by reducing scrap and rework.

Definitions

Definitions of terminology in a study as seemingly foreign to public schools as one aspiring to find out how well our schools are serving customers requires a high "quality" effort at bridging the semantics gap. The following terms are couched in the framework of this study:

Associates	All employees including administrators.
Certificated	Teachers, counselors, librarians, and others required to have teaching certificates. For this study, administrators were surveyed as a separate group.

Classified staff	Teacher aides, bus drivers, secretaries, bookkeepers, custodians, and others not required to hold professional licenses for employment.
Coproduction	The person providing a service and the next-in-line customer receiving the service share responsibility for the quality and outcome of that service.
Customer	The person or persons who receive and act on the output (product or service).
Customer Requirements	What the customer wants, needs, or expects from the output (product or service). The customer and supplier negotiate and agree upon the requirements.
Customer Service	The attention, care, and courtesy given by an associate to meeting customer needs.
External Customer	All persons not paid by the organization who receive the output.
Interactive Skills	Initiating, reacting, & clarifying behaviors.
Internal Customer	All paid employees and administrators who receive an output from another paid employee.
Output	The product or service an associate produces or performs.
Performance Standard	Meeting agreed upon customer requirements completely and consistently, with no mistakes.
Quality	Conformance to agreed upon customer requirements, internal and external.
Quality Improvement Process	QIP is the process the system uses to prevent problems and errors. QIP can be used to evaluate a current work process, or to develop new work processes.
Quality Problem-Solving Process	A disciplined process the system uses to solve the problems that prevent us from meeting customer requirements. This process places extroordinary emphasis on a) using relevant data and statistical processes to ascertain what the real problem is; and b) the importance of teamwork to find workable solutions.
Quality Training	New Employee Quality Training consists of approximately 30 hours of training in the meaning of quality, a structutred problem-solving process, and a structured quality improvement process.

Rework	Performing the work or service over again following mistakes or ineffective work.
TQM Statistical tools	Fishbone Analysis, Pareto Charts, Histograms, Run Charts, Control Charts.
Supplier	The person or group responsible for providing outputs to customer(s).
Total Quality Management	Use of Quality strategies to serve the customer, to continuously improve, and to provide outputs that are checked at each step of the process by each associate responsible for the output to insure high quality, and no mistakes.

Delimitations

This study purports to identfy the effects 30+ hours of content-specific quality training and implementation of TQM have had on the work behaviors and attitudes of 150 associates in one small rural school district in America. The huge variability in size of school districts has already impacted the degree to which some districts have decided to implement this strategy. Some districts don't provide any structured training. Most train only a few administrators, others concentrate on training teachers in several schools. The length of training and the content of training are not constant across districts implementing quality.

Generalizing findings to all school districts or even to those who are doing TQM is not a likely outcome. Yet, Rappahannock's experience in quality training, its strides and growing pains of quality implementation, and the hoped for evidence of continuous improvement may serve as a beacon for other districts or individual schools which may consider TQM.

Overview of Dissertation

The Rappahannock County Public Schools in Virginia started implementing Quality Management in the fall of 1990 and will complete the initial implementation process in May, 1993. The School Board and senior management in the school

system hope that this strategy will provide a culture and process for continuous improvement of each student, employee, and the school system itself. The emphasis of the strategies is on serving the customer and providing quality educational and support services to the customer.

This study is intended to determine whether this significant change process is having the desired effect. Qualitative methods of naturalistic inquiry including individual interviews, observations, Likert-style surveys, and open-ended surveys will be utilized to gather information to determine whether employees' work processes and attitudes have changed as a result of the implementation. Parents and students will also be surveyed to determine what effect, if any, the two years of quality implementation have had on them.

Review of the Literature

From an historical perspective Total Quality Management was not "made in Japan," but actually had its roots in pre-great depression America. The Industrial Revolution had institutionalized mass production. When assembly lines supplanted most tradesmen and craftsmen, lower worker commitment to product quality resulted. To combat this, most manufacturers started placing inspectors at the end of the assembly line. The inspector caught most production mistakes, but this did not improve assembly line workers' interest or investment in product quality.

Bell Telephone Laboratories employed a statistician, Walter Shewhart, who developed a theory of statistical quality control. Shewhart pioneered the use of control charts in 1924 to map company production to determine variation in product quality. He distinguished two types of variation: assignable cause variation and random variation (1939). A protege renamed these as special cause variation and common cause variation (Deming, 1992). Special cause variation is often due to issues associated with personnel. One low "blip" in the daily production of telephone receivers, for example, could be caused because a key production person was sick and was replaced by a less capable one. Common cause variation, on the other hand, is related to system problems. A reduction in the amount of rework necessary in the production of telephone receivers, for example, might have been caused by a recent change in production procedures.

Shewhart served as mentor for W. Edwards Deming, Joseph Juran, and others at Bell's Hawthorne plant in the 1920's. Deming, a young physicist with a P.Hd. from Yale University, based his Red Bead variation experiment and his view of the organization as a system at least in part on Shewhart's theories. Deming developed his 14 Points as a working philosophical framework for

organizations to use to implement a system of continuous improvement. These include: "1) Create constancy of purpose for improvement of product and service. 3) Cease dependence on mass inspection. 7) Institute leadership. 8) Drive out fear. 13) Institute a vigorous program of education and retraining. 14) Take action to accomplish the transformation" (1986, p. 23).

Deming was convinced that companies that adopted quality and worked to continuously improve through a reduction in systemic variation would become the leaders in their respective industries. Deming and Juran embraced quality improvement theories and linked them to the notion of serving the customer to formulate a philosophy and practice of in-process inspection and continuous improvement by each person in the production process with the ultimate goal of providing a better quality product to the customer.

Deming enhanced the concept of continuous improvement by adapting a planning cycle invented by Shewhart. Deming's version of the cycle is "Plan-Do-Study-Act." Any improvement ideas that are generated in the initial planning cycle can be incorporated in the next P.D.S.A. cycle (Deming seminar, 1992).

Deming also developed the theory of Profound Knowledge. Deming feels that an understanding of the four elements of Profound Knowledge are prerequisites for improvement to occur. The four elements are: a) appreciation for a system, b) knowledge about variation, c) theory of knowledge, and d) psychology (Deming seminar, 1992).

Deming's conception of quality is meeting customer requirements. Juran takes this a step further: "The goal should be customer satisfation rather than mere conformance to stated needs" (1992, p. 96). For Juran, quality is "fitness for use" and "freedom from defects" (1989). Juran also contributed the notion of internal

and external customers . External customers are those not paid by the company who receive and use the company's product or service. Internal customers are employees who have shared responsibility for product / service quality, and in the performance of their duties receive products and services from other employees and management.

Garvin has developed five approaches to the definition of quality: 1) transcendendent , 2) product-based, 3) user-based, 4) manufacturing based, and value-based quality (1984, pp. 25-43) He identifies eight dimensions of quality: reliability, durability, performance, aesthetics, serviceability, conformance, features, and perceived quality (p. 29-34).

Deming, Juran, and other theorists including Feigenbaum and Crosby, prepared the foundation for what today is called Total Quality Management (TQM). In the formative years of TQM, the few Americans listening to Deming and Juran weren't corporate executives. Portions of the American military establishment did listen, however, and applied strategies of continuous improvement to the design and production of war munitions. When Deming and Juran travelled to Japan following World War II to provide consultation to rebuild Japan's economy, the Japanese attributed their nation's defeat, in part, to the superior quality of America's munitions.

Deming provided statistical process control training and quality improvement strategy sessions for Japanese corporate managers and told them that if they adopted TQM, they would "capture markets the world over within five years" (Walton, 1986, p. 14). His contributions to that country's recovery were later recognized by the annual presentation of the Deming Prize. Japan's Kaoru Ishikawa became an expert in quality and helped the spread of TQM and instituted

use of Quality Control Circles throughout the country (1968). Not only did his countrymen rebuild, but they gradually shed the shabby "Made in Japan" image and garnered increasing shares of world markets in electronics and automobiles during the third quarter of the 20th century.

TQM revisits America

In 1980, Deming appeared on an NBC special "If Japan Can, Why Can't We ?" to tout TQM as a process for corporate America to regain some of the market share it had lost to Japan . American companies like Xerox, Ford, General Motors, Motorola, and others who lost significant market share to Japanese firms in the 1960s, 1970s, and 1980s, began to adopt TQM techniques.

The rebirth of TQM in America has included service-oriented organizations as well as production industries. Organizations whose survival is dependent on the services they provide include fast food chains, financial institutions, mail order businesses, and hospitals. Customer service in these and similar organizations means more than "service after the sale." Davidow and Uttal assert that "Lacking meaningful ways to distinguish among core products and services, people decide to do business based on how they expect to be treated" (1989, p. 25).

Robert Desatnick advises companies on how to "select in" employees who have a predisposition to providing quality customer service by using "behavioral interviewing" to get applicants to talk about prior work experiences in an open-ended question format. "Some of the behaviorial characteristics that constitute a service orientation," says Desatnick, "include oral communication skills, cooperation and teamwork, problem solving, decision making, sensitivity and concern for others, dependability, judgement, enthusiasm, high energy level, flexibility, and adaptability" (1987, p. 36).

Albrecht and Zemke identify three factors that make for success and effectiveness in dealing with customers: maturity and self esteem, social skill, and tolerance for contact - including ability to avoid customer contact "overload" (1985, p. 114). They also identify experience factors that affect customer goodwill: 1) care and concern on the part of public contact people, 2) problem solving capability in frontline personnel, 3) spontaneity and flexibility in the application of policies and procedures, and 4) ability of frontline people to make things right for the customer when things have gone astray (p. 158-9).

Parasuraman, Zeithaml, and Berry identify the key dimensions of service quality. Providing the promised service promptly and accurately (reliability) is the most critical dimension. Other critical dimensions are courtesy (including refraining from acting busy), friendliness, empathy / caring, willingness to listen, responsiveness, and perceived level of involvement of the service provider (1990, p. 16 - 27). Later in their book Delivering Quality Service: Balancing Customer Perceptions and Expectations, they allude to another dimension of service quality: cooperation of the customer. "In many service businesses, part of the reason employees have difficulty delivering good service is that customers themselves are not fulfilling their roles in service delivery" (1990, p. 109).

Evaluating TQM in the U.S.

It is difficult to assess whether the use of TQM by an estimated three-fourths of companies in the United States has made a difference. Profits and marketshare are accepted measures in the business world. Xerox, Ford, and Motorola have all claimed increased sales and reclaimed portions of the markets lost to Japan during the 1970s. I.B.M. has been less fortunate experiencing a huge deficit during 1993. Those four corporations joined with Proctor and Gamble and

American Express to tout positive results of TQM in an open letter to encourage use of TQM on college campuses : 1) product develpment cycle time cut in half, 2) things "gone wrong" reduced by 75%, and 3) a 1.5 billion savings in scrap and rework over five years (March, 1992).

The quality yardstick developed by the U.S. government in 1987, the Malcolm Baldridge Quality Award, has experienced declines in award applicants two consecutive years since the peak in 1991. Experts offer these explanations for the decline in applications: a) companies using TQM realize that the award will be given to world-class users only, b) most focus on profits over prestige, c) some have received previous Baldridge feedback that the company still has a long way to go to win the award, and d) there's a greater corporate emphasis on meeting ISO-9000 international standards at customers' insistance (Doyle, June 1993).

In a study of 536 firms (56 % of which used TQM) in the U.S., study co-sponsors Development Dimensions International, Industry Week, and the Quality and Productivity Management Association concluded that "for those who stay the course, rewards will come." The study found that TQM is an emerging business strategy, that it does improve organizational performance, that TQM is still the most viable longterm business strategy, and significant gaps have been identified between what's needed for successful implementation and actual execution. The largest gaps found were in the areas of a) executive commitment and b) training (Kendrick, May 1993, p. 13). In a separate review of the same study, it was found that a) 80% of over 7,000 employees of the firms using TQM credited the strategy with high to moderate success in customer satisfaction and retention, and b) 75% felt that TQM was successful in improving operational results (Filipczak, July 1993).

Another study commissioned by McKinsey and Company found that of quality efforts in place for two or more years, as many as two-thirds have failed. Reasons cited: giving up and abandoning quality due to unrealistic expectations (the reality is that TQM is "evolutionary, not revolutionary"), failure to focus on strategic objectives, not establishing job security, looking at TQM as a goal instead of a process, not establishing an infrastructure, and neglecting rewards (Doyle, August 1992).

Harari gives 10 reasons for what he feels is a poor showing by TQM in the United States. Among them: TQM focuses on processes instead of results. TQM focuses on minimum standards. and TQM develops its own bureaucracy. Also, TQM, through an inordinate emphasis on standardization, drains innovation from corporate culture (January 1993).

TQM in Public Education

Many theorists are flocking to the emerging paradigm of TQM in public education. Deming himself is helping to shift the paradigm by conducting seminars for educators. Among his recommendations for improving education: 1) Raise the status and pay of all teachers, and eliminate merit pay. 2) Eliminate grades and competition among students. 3) View education as a system (Deming Seminar, 1992). Deming's conception of "education as a system" portrays parents as suppliers of raw material, the students. The school and teachers provide curriculum and teaching to advance the student from grade to grade. The one-time raw material emerges from grade 12 as the product for employers, colleges, and society (1992). Deming protege Ron Moen has adapted to the education setting Deming's production of a system with the final product being the student entering society with knowledge (1991).

Others disagree with the student-as-product theory. "The school is not a factory," says former teacher and former Xerox Vice President Myron Tribus, "and students are not the product. Their education is the product" (1992, p. 1). Tribus' model shows students as the teachers' customers, because the student is the individual who most directly receives the teaching service. Holt agrees that the student is the customer of educational services, but identifies the parent as the student's "sponsor or personal agent." (1993, P.386) David Bayless defines quality improvement in education as the provision of instructional services that "surpass the customer's (student's / learner's) needs and expectations" (1991, p. 18).

The issue of improving the process of schooling is gaining momentum as a key factor in implementation of TQM in public education. Lewis Rhodes feels that a major barrier to acceptance of Deming's philosophies in schools is "poor knowledge of the work, workers, and work processes in schools" (1990, p. 26). Just about everybody thinks they know what students and teachers are supposed to do. The teacher teaches certain material, the student learns/doesn't learn the material, and the teacher inspects at the conclusion of teaching by giving a quiz, test, or exam. But what do those teaching or learning processes really look like. Bayless describes a process as "all the work activities, tasks, and events directed at accomplishing a particular outcome" (1991, p. 21).

Bayless, consultant to a large county school system, has devised a step-by-step procedure of defining school and classroom process variables. Once educators accurately identify and improve the teaching process and measure process variables frequently instead of at just the end of the process, improvement of the system of education can take place.

Gilbert (1993) attempts to draw parallels between various service quality traits and education. He maps Garvin's 8 Dimensions of Quality (1984) with Zeithaml, Parasuraman, and Berry's 10 Dimensions of Service Quality (1990) with 15 elements of effective teaching. For example on one level he relates Garvin's "reliability and durability" with Zeithaml's "reliability" with classroom "organization and rigor." On another level he equates Garvin's "conformance" with Zeithaml's "competence" with classroom "subject mastery" and "self improvement" (Glbert, p.76-78).

Kaufman links certain key elements in a conventional TQM project for education. These are: "client-citizen satisfaction, quality output-competent completers, quality products (passed tests, courses), educator-learner competent performance, and quality inputs-resources" (1993, p. 14). He also has developed expectations for what quality teams should accomplish in an educational setting: define and pursue quality, work to improve processes that will improve quality, promote a team spirit of everyone working together and individually to achieve quality for the customer (p. 11). Kaufman departs from conventional wisdom on quality that makes quality everyone's job when he proclaims that "quality management participation is only by choice" (p. 55).

Bonstingl identifies four pillars of school quality: 1) primary focus on suppliers and customers, 2) constant dedication to continuous improvement, 3) a systems / process orientation, and 4) strong and consistent quality leadership from top management (1992, p. 34). Bonstingl elaborates on the second and third pillars: "To help students engage in constant improvement, we must make the teacher-student learning system the focal point of instruction so that the way teachers and students interact in the learning process can be continually fine

tuned" (p. 29). Schmoker and Wilson (1993) agree that education is a system of processes that are improvable. But they feel that the American education system needs to change its emphasis from educating just the elite to develop new products through inventions and technology. "What will be the consequences of neglecting to provide a high quality education for a far greater number of students? We will, as we are already doing, lose jobs to others" (p. 3).

By the late 1980's a few United States school districts had begun to explore the use of TQM as a process to improve services to "customers" in public education. The Sacramento County School District claims to be the first to implement TQM in K-12 public education "organization-wide" in 1986 (Meaney, 1991). Sacramento County is actually an intermediate service district that provides overall administration for 16 districts, plus centralized vocational education and special education services.

Some of the early TQM efforts in public education were bankrolled, at least in part, by business-industry partnerships with school districts. The rationale for these expenditures: if, through participation in pilot TQM projects, schools could do a better job of preparing students academically, plus teach them continuous improvement and customer service skills, ultimately less money might be spent in the workplace for retraining. In 1987, National Westminster Bank USA provided training for the faculty of Brooklyn's Westinghouse Vocational High School to implement quality (Schargel, 1987). Later, IBM joined the partnership with Westinghouse High to provide quality training for a volunteer group of faculty, parents, and students (Rappaport, September 1993).

In the mid to late 1980s the Eastman Chemicals Company provided 10 days of quality training for 8 Kingsport, Tennessee Public School administrators. The

training titled "Managing for Excellence" was adapted from Deming's work. The training consisted of focus on 6 principles that were viewed as a composite of Deming's 14 Points: 1) Customer satisfaction first, 2) respect for people, 3) continued improvement, 4) processes and prevention, 5) manage with facts and data, and 6) management leadership (Tollett, 1992, p.128-29).

In 1989 Xerox Corporation's C.E.O., David Kearns, facilitated the development of a partnership with the Virginia Department of Education to explore a pilot implementation of Quality Management in three public school districts. With additional U.S. Department of Education partnership grant funds, the Xerox/Virginia Department of Education effort was expanded in 1991 to eight Virginia school districts including the Rappahannock County Public Schools (VSEN, 1992). The facets of Rappahannock's TQM training are listed on pages 5 and 6. Across the continent, leaders at Mt. Edgecombe Vocational High School in Sitka, Alaska, used their own resources to train students in the quality improvement strategies one of their teachers had learned at Deming seminars (Tribus, 1990).

Increasing numbers of America's public school districts are looking to Total Quality Management (TQM), as espoused by Deming and others, to improve their services to "customers." By 1993, more than 100 school districts nationwide had started implementing some form of TQM (Horine, 1993). The American Association of School Administrators (A.A.S.A.) formed a Quality Network in June 1991. Almost 400 public school districts have representitives in the network (1992).

There is great variation in the content and length of TQM training for educators. Some school systems provide as little as a checklist on how their

schools' operationalize Deming's 14 Points. Other districts offer a partial day inservice titled "Introduction to Quality." Still others provide 30 + hours of quality training.

Likewise, there is considerable variation in the way TQM is implemented in schools across the country. Eighty percent of the districts reported using quality tools to improve administrative services, 50% to improve teaching methods, and 50% to increase student achievement (Horine, 1993 p. 33). Some use quality to try to improve all aspects of the system. Many rely on ad hoc project teams to solve problems as they are detected. Still others mandate that all associates serve on standing problem solving or quality improvement teams to improve instruction.

Coproduction

At the time TQM was gaining acceptance by American corporations, academicians in Public Administration developed the concept of "coproduction" (Whitaker, 1980). At the heart of the theory of coproduction is the notion that the person providing the service and the next-in-line customer receiving the service share responsibility for the quality and outcome of that service. Gordon Whitaker describes coproduction in three service settings :

> Education or health care or crisis intervention have as their primary objective the transformation of the consumer. Others may benefit from a child's education or a worker's good health or the pacification of a husband and wife in a heated argument, but the primary beneficiaries are the clients themselves.
> In "delivering" services the agent helps the person being served to make the desired sorts of changes. Whether it is learning new ideas or skills, acquiring healthier habits, or changing one's outlook on family or society, only the individual served can accomplish the change. He or she is a vital "coproducer" of any vital transformation that occurs (1980, p.240).

Not one teacher, principal, superintendent, or school board in America can

guarantee that every child that is taught well will learn well. That, however, does not give educators the license to serve up their teachings and say: "Here it is. Take it, if you want to learn and progress; leave it, if you don't care." Nor does the total responsibility for student success fall on educators. John Jay Bonstingl calls teachers and students the frontline workers of the school (1992). William Glasser maintains in Quality Schools that teachers (the managers) need to learn how to manage their students (the workers) to do quality work (1990). "Public education," says Chappell, " has to do more than manage. It simply must help students and parents learn, accept, and perform their roles in the improvement of instructional services. Our view is that educators, students, and parents can and should coproduce educational services using the tools and strategies of TQM" (1993,p. 3).

Evaluating TQM efforts in public education

There is scant evaluative data available on TQM in public education. Part of the reason for this is the relative newness of TQM to education compared to the corporate world. Also, prior to starting their TQM initiatives, few of the districts now using this strategy had any national attention or notoriety due to the predominantly local nature of their operations. Therefore, the interest to conduct comprehensive studies has not surfaced.

The study by Horine cited earlier provides data primarily associated with how school districts are using TQM, and not so much on results of those efforts. The few results listed included: a) reduced cycle time for special education referrals in Waco, Texas, b) reduced student tardiness at Southbridge, Massachusetts, c) reduced school safety problems at the Sacramento Office of Education, d) reduced 4th grade remedial counts at Rappahannock County, Virginia, and e) reductions in the cost of tax collections at the State College, Pennsylvania, Area

School District (October 1993, p. 32).

Another study was conducted by the Evaluation Center at Western Michigan University. The study focused on consultant-facilitated implementation of TQM in classrooms in several elementry schools in North Carolina and Florida. The consultant met with teachers and administrators in each school to provide training and facilitation to enable teachers to use TQM tools in their classrooms. In a telephone interview with Dr. Daniel Stufflebeam, Director of the Evaluation Center, he was asked about the results of the study. He indcated that based on his review of project materials and visits to two of the sites, "the project did not produce what the teachers needed to analyze and improve their teaching, did not motivate and train more than a few of them to independently employ the TQM process, and did not endure once the projects ended and the consultant had left the scene." In Dr. Stufflebeam's judgement, this particular application of TQM did not adequately consider the great time demands on teachers and the diversity of student needs the teachers must address (November 1993).

Several individual school districts have given some evaluative information to authors writing about TQM in education. In the Kingsport City Schools, student attendance improved anywhere from 2 to 94% during the first year of implementation. Six teachers in the district who piloted the TQM program led efforts that "resulted in better grades, higher attendance, team support, and improved self-esteem" (Tollett, 1992, p. 135).

At Mt. Edgecomb Residential Vocational High School in Sitka, Alaska, students improved their salmon manufacturing-marketing effort through use of quality principles. One new order following the implementation of TQM amounted to a $140,000 contract for export of smoked salmon. Also, TQM at Mt. Edgecomb

contributed to: a 71% reduction in student tardiness, reduction in the dropout rate from 40% to 1%, and reductions in student and teacher turnover rates (Schmoker and Wilson, 1993). Students are learning self-management and evaluation techniques, using control charts to monitor their own time devoted to study, etc. As a result, "student behavior problems have all but vanished" (Tribus, 1990).

The Koalaty Kid Projects at Carder Elementary in Corning, New York and at the Perry School in Erie Pennsylvania are partnerships with Corning, Incorporated and the American Society for Quality Control. This effort to teach kids quality has resulted in higher attendance rates and in markedly increased student interest in reading (Bonstingl, 1992, p. 40).

It is apparent that there are few measures that have been developed to help assess TQM in public education. Certainly, a primary reason for this study is to contribute to the development of measures that can be used to help assess the effects of using TQM in school settings. This is addressed further in later chapters. The results relative to an evaluation of the Rappahannock County Schools' TQM effort is found in the results chapter.

TQM in higher education

Corporate encouragement and seed money can be credited with getting U.S. colleges and universities started with TQM implementation. In August 1991, six corporate giants sponsored a Total Quality Forum for 200 corporate and higher education participants. The six (American Express, Ford, Motorola, Proctor and Gamble, IBM, and Xerox) presented an open letter lamenting that unless universities embraced and started teaching students TQM principles and skills in business and engineering courses, the perpetuation of a "competitive disadvantage" in global markets would be sustained. The six reasoned that their

products were priced higher than necessary, in part due to huge corporate employee retraining costs (Harvard Business Review, Fall 1991). White reported that corporate participants at the forum told universities that their future recruiting efforts would be focused in universities that teach their students TQM. Another expectation: great universities would replace "weeding out" activities with "cultivating activities" (April 1992, p. 29).

The Delaware County Community College was among the first to use TQM in higher education. To get started, in 1985 the college president enrolled himself and his executive staff in a year long TQM seminar sponsored by the Philadelphia Area Council for Excellence (1992, p. 36). In the late 1980s, Scott identified the engineering schools at West Virginia University and at Notre Dame University as "taking the lead in introducing TQM into the nation's educational system" (December 1989, p. 67)

Horine, Hailey, and Rubach (1993) conducted a study of 425 colleges and universities that were listed as members of various quality networks and consortiums. One hundred thirty-nine universities and 46 community colleges responded to the survey. Process improvement efforts have been concentrated in: administration (over 65%), teaching methods (over 50%), and student achievement (18% of universities compared to 43% of community colleges). Less than 25% of all institutions responding acknowledged that TQM was in use throughout their organizations. TQM courses for students in the responding institutions are concentrated in: business mangement (universities 77%, community colleges 50%), statistics (universities 51%, community colleges 43%), engineering (universities 49%, community colleges 41%), continuing education (universities 29%, community colleges 52%), and education (universities 14%, community

colleges 15%) (October 1993, p. 42-43).

Kendrick reports on a study of 976 deans of business and engineering schools in the United States. Asked was "How important is it to teach principles and methods of total quality at your school?" Ninety-two percent of respondents expressed that TQM is an extremely or very important topic. However, only 38% of those deans think their faculties agree that TQM is an important topic (January 1993, p. 13). Kaplan states that the reality of the situation is that leading business practices in TQM are way ahead of academia's researchers and teachers (fall 1991, p. 13-21).

Seymour identifies three tools of strategic quality management in the higher education setting: teamwork, measurement, and systematic problem-solving. He claims that change in organizations of higher education doesn't occur without external motivation and the means (in this case TQM). He further identifies four external motivational forces that are forcing colleges to consider TQM: an increased competitive environment for student tuition fees, an escalation of costs, the trend towards greater accountability, and the blurring of distinctions between products and services (1992, p. 3, 18-20). Bogues and Saunders identify six tests for quality in higher education: 1) Accreditation - the test of mission fulfillment, 2) College rankings and ratings - the test of reputation, 3) Followup studies - the test of client satisfaction, 4) Licensure - the test of professional standards, 5) Academic progress reviews - the test of goal achievement, and 6) College outcomes - the test of results (1992, p. 215-224).

Evaluation of TQM efforts in higher education

The Horine study referenced some outcomes of implementing TQM in colleges and universities including: a) El Camino, California Community College

quality teams have reduced processing time and customer complaints, b) California Polytechnic State University reduced purchase order cycle time, c) Wisconsin's Fox Valley Technical College reduced employee absenteeism, and d) Harvard's quality teams have reduced data entry error by 85%, and have realized an annual $60,000. savings in network services expenses (p. 43). Seymour reports results from other TQM efforts in higher education: Oregon State University has reduced duration of remodeling jobs by 23%, error corrections on journal vouchers returned to departments by 94%, and increased daily building security checks by 17% (1992, p. 39).

As in public education, evaluative data on collegiate TQM efforts is not yet readily available. In both higher education and public K-12 education, TQM initiatives range in age from infancy to pre-pubescence. It is unlikely that significant results will be available until TQM in education reaches adolescence or adulthood.

Methodology

"Qualitative / illuminative evaluation," a research method that employs naturalistic inquiry was utilized to accomplish the study. Interviews, closed and open-ended surveys, and observation will be utilized to gather data. A Gantt Chart (appendix B) was used to define and delineate the various aspects of quality training and implementation in the school division. Expected changes / outcomes were identified to focus on points of inquiry for instrument development.

The primary population for this study consists of all 146 "full-time" associates of the Rappahannock County Public Schools willing to participate in the study. Of that number, 126, or 86% received approximately 30 hours of quality training. The 16 untrained associates are predominantly bus drivers who have received inservice on quality philosophies as part of the emphasis on customer service and team problem solving within their department. Associates were given an open-ended survey focusing on how things have changed in the workplace as a result of TQM (Appendix D).

Surveys were also offered to all students (Appendix E) in grades 4 - 12 in several group administrations. Fifty percent of all parents of Rappahannock County students grades K-12 were mailed surveys (appendix F). The purpose of these surveys is to determine whether: 1) these groups perceive they are being treated as customers of the school division's services, 2) there has been any "trickle down" effect of the quality philosophies of customer service, continuous improvement, and team problem solving to them, 3) students and parents feel any responsibility to coproduce quality educational services, and 4) whether they perceive associates of the district have changed the way they work with people, and increased their efforts to meet students' needs.

The instruments (appendix D,C,E) prepared for use with this study were administered during late May and early June, 1993. All 146 fulltime certificated and classified associates of the Rappahannock County Schools were invited to a group administration of the staff survey one afternoon conducted by the primary researcher. Those who were not able to attend that afternoon session were invited to a makeup session the following morning. Participation was purely voluntary. Of the 146 total pool, 124 associates, or 85% of the total, consented to participate in the study. Surveys were turned in at the time of administration.

The primary researcher invited all 674 students in membership in grades 4-12 in the Rappahannock County Schools to participate in large group administrations (average group size 75). Of the total, 573 students, or 85%, consented to participate in the study. Of 297 elementary students in grades 4-7, 262 or 88% participated in the study. Of 377 high school students in grades 8-12, 311 or 82% participated in the study. All surveys were returned at the conclusion of the administration period.

Of the 700 family units having children enrolled in the Rappahannock County Schools, 350 parents, 50% of the total, were mailed surveys with stamped returned envelopes. The researcher arrived at the 700 family units by removing duplications from the mailing list. He then mailed a survey to every other parent on the list. Of the 350, 75 parents, 21% of the sample, returned surveys. In early to mid July, thirty-two non-responding parents were randomly selected and called to inquire about their willingness to participate in the survey. Five indicated that they returned the survey, but not the separate permission form that would have identified them as being responsive. One said she preferred not to participate. Six stated that they had put the survey in their bills payable stack to fill out later and would send it

in now. Nine requested that I send them another survey because they had misplaced or not received the original survey. Eleven gave responses over the telephone. The followup produced 24 additional survey respondents for a total of 99 - or 28% of the original sample.

Quality Customer Satisfaction Index for Education- QCSIE

Three scaled scores were derived for each student responding to the survey: 1) An overall or total TQM score called QCSIE-T; 2) A customer satisfaction score titled "Quality Customer Service Index for Education," QCSIE-1; and 3) A coproduction score titled "Quality Coproduction by Students Index for Education," QCSIE - 2. The scores will be calculated by the following methods:

QCSIE-T

The student "Total TQM Score" will be derived from responses to 14 of the first 15 items (omit questions 12) on the Student survey. These will be computed for each student. The total possible responses on the 1 to 5 Likert scale range from 14 to 70 with an average of the possible scores of 42. Individual scores that fall between 43 and 70 reflect a positive student response by the student to the 14 items. Those that fall between 14 and 41 reflect a negative response. These items include responses to students' awareness about TQM, responses about students' efforts to produce their own quality education, and responses about how well the school is meeting their needs. QCSIE-T is a student's total "TQM score." It will be an indicator of his knowledge about the district's quality effort and a composite of the student's QCSIE-1 and QCSIE-2 scores which are subsets of the QCSIE-T score.

QCSIE-1

The student "Customer Satisfaction Score" was derived from responses to a

subset of eight questions (#'s 7,8,9,10,11,13,14,15) on the Student survey. These will be computed for each student. The total possible responses on the 1 to 5 Likert scale range from 8 to 40 with an average of the possible scores of 24. Individual scores that fall between 25 and 40 reflect a positive student response to the 8 items. Individual scores that fall between 8 and 23 reflect a negative student response. The score derived for each student is a scaled representation of how well the student feels his customer needs are being met by the school.

QCSIE-2

The "Student Coproduction Score" will be taken from Student survey questions 1-6 including four that ask the student to self rate his input to the production of a quality education. The total possible responses on the 1 to 5 Likert scale range from 6 to 30 with an average score of 18. Scores from 6 to 17 indicate a negative student response, scores ranging from 19 to 30 reflect a positive student response. A coproduction score for a student is viewed as his level of willingness to help produce quality education from the instructional services he receives from the school.

Use of QCSIE data

Scores were arrayed by numbers of high school and elementary students who score in the positive and negative ranges for each measure. Responses to the QCSIE-T scale were aggregated for the student body as a whole and for each of the two schools. These may be viewed as total TQM indicators for the groups of respondents. Numbers of positive and negative scores on the QCSIE -1 scale were tabulated for students in each school and for the school district to reflect levels of customer satisfaction for each school and the district. Numbers of positive and negative responses on the QCSIE-2 scale were similarly tabulated for students in

each school and for the school district to ascertain how willing students are as a whole to help produce their own education.

A linear regression was used to determine whether there is a relationship between Q-1 and Q-2, between a student's perception of how well his customer needs are being met on the one hand, and how committed he is to helping produce his own education on the other. Since the Q-1 and Q-2 scales are subsets of Q-T, no effort will be made to ascertain whether there is a relationship between those scales and Q-T.

Internal reliability of QCSIE Scales

Cronbach's coefficient alpha was used on each of the three QCSIE-scales to determine internal reliability. Fifteen student surveys were randomly selected to perform the test.

Diff Score

Responses to question 16 on the student survey will be used to determine a classroom "subjects difficulty score" or Diff score for each student. Question 16 asks each student to rate the difficulty of each school subject on a Likert scale ranging from 1= "Too Easy" to 5= "Too Difficult" as a measure of how well the subject met his needs. Because students take different quantities of courses, the "difficulty score" for each student will be derived by summing all of a student's responses and dividing the total by the number of subjects he took to produce an average difficulty score for each student. An average score is 3.0. Student "subject difficulty " scores ranging from 1.00 to 2.99 are in the "easy" range. Scores ranging from 3.1 to 5.0 are in the "difficult" range.

Imp Scale

Finally, students' responses to survey questions 17 = "What has improved

about the school / school district" and 18= "What would you improve about the school / school district?" will be tabulated. Student scores on these items will range from 0 to ___ depending on their perceptions of how many things they feel have improved or need to be improved.

Question 17 responses will be given a positive valence and tallied for each student. His responses to question 18 will then be given a negative valence and tabulated. The student's positive and negative scores on these two items will then be totaled to equal one value (ie a +2 and a -4 = -2). This will be called the Improvement Scale or "Imp Scale" score

Multiple and linear regressions will be run to determine if any of the Q-scales or the subject difficulty scores help to explain the variation in the Imp Scale. Other efforts will be made to determine whether there are other causal relationships between the several variables.

Results

The results found in this section relate directly to the "questions to be answered" on pages 12-13 as they relate to the Gantt Chart of TQM Implementation found in the appendix (B). Questions answered by other than survey means will be addressed in the Discussion chapter.

The survey instruments (in appendix) prepared for use with this study were administered during late May and early June, 1993. Of the 146 total pool of full-time associates, 124 associates, or 84% of the total, consented to participate in the study.

Of the total 674 students in membership in grades 4-12 in the Rappahannock County Schools, 573 students, or 85% , consented to participate in the study. Of 297 elementary students in grades 4-7, 262 or 88% participated in the study. Of 377 high school students in grades 8-12, 311 or 82% participated in the study. A total of 99 of the sample of 350 parents, 28%, responded to the study.

Were all aspects of the planned TQM implementation carried out as specified in the Gantt Chart ? Yes, essentially every aspect of the quality implementation plan was carried out according to schedule. Approximately 10% of associates remain to be given the 30 hour quality training, but even that group participated on the required quality improvement teams during the 1992-93 school year.

Did TQM Training Change Associates

A central question to be answered by the study is: has TQM training / implementtion changed the way associates relate to / work with people? Also do certificated associates who volunteered for quality training differ from those who "were asked to undergo training" in the degree to which quality training/ implementation has changed the way they do their jobs ? "Certificated associates"

in this study refers to teachers, librarians, and guidance counselors. Administrators were not included in the "certificated associates" even though administrators in Virginia hold teaching certificates. Administrators are reported separately in this study.

Table 2 displays the responses by certificated associates to the survey question: "If you received Quality training, has the way you relate / work with people changed as a result of the training ?" Of those certificated associates who reported that they had volunteered for the quality training, 57% stated that they had changed as a result of training and 43% that they had not changed as a result of the quality training. Of those certificated associates who reported that they "did not volunteer" for the quality training they received, a mere 22% said that the 30 hour experience had changed the way they worked with others, while nearly 80% said that the training had no such impact on them. In all 48% of certificated associates responding reported the way they relate to / work with others had changed.

In contrast to the 48% of certificated staff who admit TQM training has changed the way they work with people, 89% report that they voluntarily used aspects of their TQM training in their work: using the six-step problem solving process, teaching that same problem-solving process to students, using the quality interactive skills, and focusing on continuously improving the quality of the processes used in their own jobs.

The student surveys also provided evidence that teachers, 97% of whom received quality training, had changed in the way they worked with students.Forty-five percent of students in grades 4-7 and 25% of those in grades 8-12 responding to the survey agreed or strongly agreed that teachers had taught them how to use the quality problem-solving process. Twenty-eight percent of certificated staff report

Table 2 Has TQM Training Changed Associates ?

"If you received Quality training, has the way you relate / work with people changed as a result of the training?"

	Yes	NO
Certificated/Vol-training	56.60%	43.40
Certificated /Not-Vol Trng	22.22%	77.78%
Classified /Vol-training	38.89%	61.11%
Classified /Not-Vol trng	63.64%	36.36%
Administrators/Vol-trng	71.43%	38.57%
Totals	49.53%	50.47%

Examples given by associates of how quality training changed the way they work with others:

Gave me process to improve	12
Teamwork/Compromise	8
Better listener	6
See how probs affect others	4
Do work right first time	4
Want to hear complaints	4
Miscellaneous Positive	8
Miscellaneous Negative	5
"I was already like that..."	8

that they taught the quality problem-solving process to their students.

There is additional evidence of an anecdotal nature collected from 795 staff, student, and parent surveys that TQM training and implementation has made a difference in the way certificated staff relate to and work with people. That will be reported in the chapter dealing with discussion of the results.

Changes in Classified Associates

What about classified staff:secretaries, bookkeepers, bus drivers, custodians, teacher aides, computer technicians, and cafeteria workers? Do those who volunteered for training differ from those who "were asked to undergo training" in the degree to which quality training and implementation has changed the way they do their jobs?

Of the classified associates responding, 74% had received training. Identifying themselves as volunteers for training were 62%; compared with 38% who said they did not volunteer. Of the volunteer group, 39 % reported that the way they relate / work with people changed; 61% that they had not. Of the group of classified associates that did not volunteer for the training, 65% reported that they had changed, 35% that they had not. As a group, 48% of the classified associates reported they had changed, the same proportion as for the certificated group.

Like the certificated group, a high percentage (86%) of all classified staff who received training reported voluntarily using things they had learned in quality training in their work.

Administrators

Did quality training change administrative staff? Because of the relatively small administrative staff , all seven are identified as having volunteered for

training even though one reported not volunteering. Seventy-one percent reported that the training made a difference in their work with others. All administrators reported that they had used features of the training in their work with others.

Did quality training make a difference in the way associates work with others? The results are mixed. Fifty percent of associates report that quality training did make a difference. On the other hand, 89% of all TQM-trained associates reported voluntarily using aspects of training such as the problem solving process (and/or teaching the process to students), interactive skills, and continuous improvement strategies in their work (See Figure 2). Examples related to ways associates had changed were sought on the surveys. Those related to changes in associates' work habits will be discussed in the next chapter.

"If you received quality training, what aspects of the training have you voluntarily used in your work?"

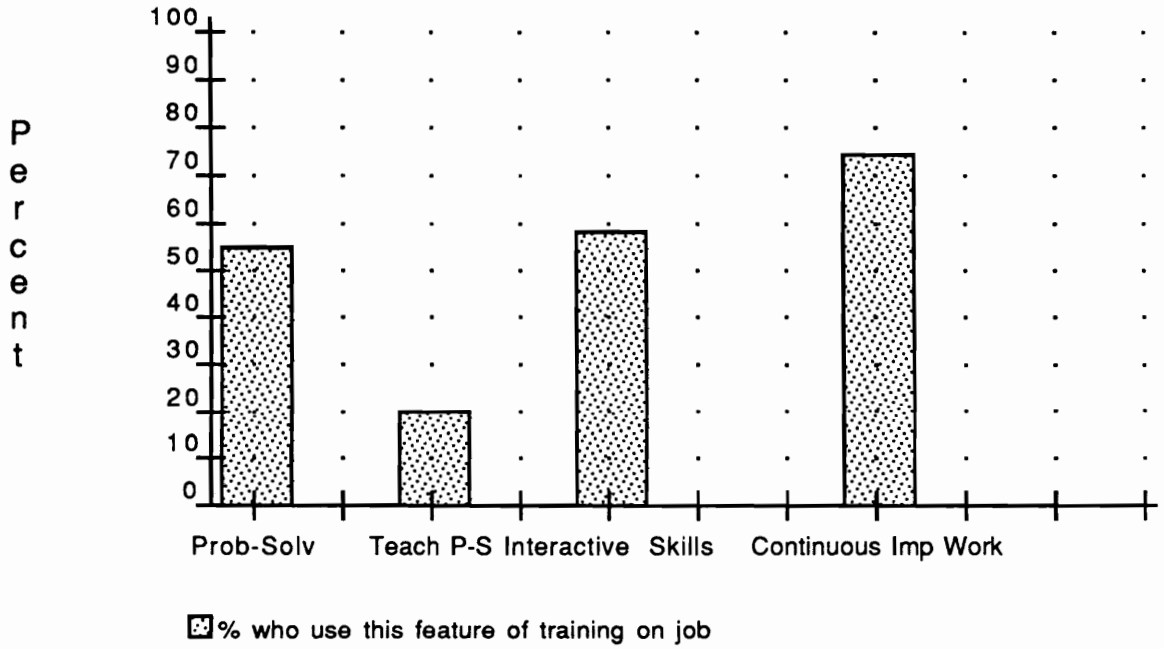

Figure 2. 89% of all trained associates voluntarily used things they learned in TQM training on the job.

Willingness to Serve Internal Customers

Teachers, bus drivers, custodians, and administrators are unaccustomed to thinking of anyone as their customer, so treating fellow employees like customers is indeed a fundamental change in they do their work. What evidence is there from the study that TQM training increased associates' interest in serving the needs of internal customers? Is there any difference for the above groups (volunteered-for training, did-not-volunteer, certificated, classified, administrative) in their willingness to serve internal customers ? Table 3 presents the tabulated responses to the two faculty survey questions that address the issue of serving school district internal customers. The data reflect no apparent differences among associates groups in their self reports of their increased efforts to meet the needs of fellow employees. A consistently high percentage, 85%, of all associates reported that they have increased efforts since the startup of quality management to meet internal customers' needs, 6% had not, and 8% reported that they "always had" done a good job of meeting other associates' needs.

Table 3. Evidence of associates' willingness to serve internal customers

"Since Quality Management was implemented have you increased your efforts to meet the needs of colleagues / coworkers?"

	Yes	No	NA	Always have
Percent	85.34%	6.03%	0.86%	7.76%

Examples given by associates of increased efforts to meet internal customers' needs:

More teamwork	14	More coverage others' duties	6
More support	12	More focus on doing reports	5
More cooperation	10	Miscellaneous	21

Do associates feel that their needs are being met by colleagues, administrators, and perhaps subordinates in the organization. A faculty / staff survey question that provides validation on the internal customer service issue is: "Since Quality was implemented, have your colleagues / co-workers increased their efforts to meet your needs?" Seventy-three percent responded that their co-workers had increased their efforts to meet their needs, but 20% said their co-workers had not.

Similar figures were produced in reponse to the question "Have administrators increased their efforts to meet your needs?" Seventy-four percent of associates felt that the superintendent's staff had increased their efforts to meet internal customer needs; 18% that they had not. Sixty-nine percent of associates felt that principals, assistant principals, and other supervisory staff had increased efforts to satisfy needs since the inception of quality management in the district, and 27% felt they had not.

Are there differences for the groups (volunteered-for training, did-not-volunteer, certificated, classified, administrative) in their perceptions as to whether they are being treated like internal customers? Tables 4 and 5 outline the perceptions of the various groups of associates as to whether administrators and fellow workers have increased their efforts to meet their needs since the start of TQM. The responses for the groups (volunteered-for training, did-not-volunteer, certificated, classified, administrative) indicate some possible differences.

As a group, classified associates (secretaries, bookkeepers, custodians, cafeteria workers, aides, and computer technicians) appear to have the strongest perception that various other groups have increased their efforts, since the inception of TQM, to meet their needs: superintendent's staff (82%), supervisors /

principals / assistant principals (68%), and coworkers (71%). In comparison, certificated staff's perceptions are Superintendent's staff (67%), supervisors and principals (64%), and co-workers (77%).

The differences appear more pronounced upon a comparison of the negative responses: "No, they have not increased their efforts to meet my needs." In reference to whether the superintendent's staff has increased efforts to meet needs: 8% of classified staff said "no," compared to 25% of certificated staff. Have supervisors and principals increased efforts to meet internal customer needs? "No" was the response of 18% classified and 33% certificated. Have coworkers increased efforts to meet internal customer needs : 13% of classified said "no;" certificated 23%.

Did volunteering or not volunteering for Quality training make a difference in the perception of internal customers as to whether the superintendent's staff, supervisors / principals, and coworkers had increased their efforts to meet their needs? Yes, members of the superintendent's staff have tried harder, reported 78% of associates who volunteered for training compared to 64% of those who did not volunteer. Supervisors and principals have tried harder too, say 74% of the volunteers compared to 46% of the non-volunteers; and co-workers have, 83% to 64%.

Differences are more pronounced for certificated associates who did not volunteer for training than for any other employee group. One-third said the Superintendent's staff had not increased their efforts. Forty percent said principals and supervisors had not increased their efforts; and 42% claimed co-workers had not increased their efforts to meet their needs.

Table 4 Are Administrators Trying Harder Since TQM to Meet Associates' Needs ?

Are Members of the Superintendent's Staff Trying Harder?

	Yes	No	Yes & No	NA	Totals
Certificated/Vol-training	38	11	4	0	53
Certificated /Didn't-Vol trng	11	6	1	0	18
Certificated /Not trained	0	1	0	1	2
Classified /Vol-training	16	0	1	1	18
Classified /No-Vol for training	7	2	1	0	10
Classified /Not trained	8	1	1	0	10
Administrative/Vol-training	7	0	0	0	7
School Board/ Not trained	4	0	0	0	4
Totals	91	21	8	2	122
%	74.59%	17.21%	6.56%	1.64%	

Are Principals, Assistant Principals, and Supervisors Trying Harder?

	Yes	No	Yes & No	NA	Totals
Certificated/Vol-training	36	17	0	0	53
Certificated /Didn't-Vol trng	8	7	2	0	17
Certificated /Not trained	2	0	0	0	2
Classified /Vol-training	14	3	0	0	17
Classified /Didn't Vol-training	4	3	2	0	9
Classified /Not trained	8	1	0	0	9
Administrative/Vol-training	6	1	0	0	7
School Board /Not trained	4	0	0	0	4
Totals	82	32	4	0	118
%	69.49%	27.12%	3.39%	0.00%	

Table 5. Do associates feel colleagues are increasing efforts to meet their needs?

"Since Quality was implemented have your colleagues / coworkers increased their efforts to meet your needs?"

	Yes	No	Yes & No	NA	Totals
Certificated/Vol-training	45	6	0	2	53
Certificated /Didn't-Vol trng	10	8	1	0	19
Certificated /Not trained	1	1	0	0	2
Classified /Vol-training	15	2	0	0	17
Classified /Didn't-Vol trng	6	1	2	0	9
Classified /Not trained	6	2	3	0	11
Administrative/Vol-training	5	2	0	0	7
School Board/Not trained	2	1	0	1	4
Totals	90	23	6	3	122
%	73.77%	18.85%	4.92%	2.46%	

Serving External Customers

If treating fellow workers like customers was a new paradigm for school associates, imagine how difficult it was for them to start thinking of students and parents as customers. Have associates increased their efforts to meet the needs of parents and students, the district's external customers? Is there any difference for the groups (volunteered-for training, did not volunteer for training, certificated, classified, administrative) in their willingness to serve external customers ?

Table 6 presents the tabulated responses to the faculty survey question that addresses the issue of serving school division external customers. The data reflect no apparent differences among employee groups in their self reporting of their increased efforts to meet the needs of parents and students. A high percentage, 85%, of all associates report that they have increased efforts to meet external customers' needs, 7% had not, and 7% reported that they "always had."

Table 6. Evidence of associates' increased willingness to serve external customers

"Since Quality was implemented have you increased your efforts to meet the needs of parents & students?"

	Yes	No	NA	Always have
All Associates	84.87%	6.72%	1.68%	6.72%

Examples of how associates Increased their efforts to serve customer needs of parents & students:

More home communication	32%
Survey parents	7%
Survey students	7%
More flexible	5%
Plan more creative work	2%
Miscellaneous examples	14%

Customers' Perceptions

The district's external customers, parents and students, were also given a chance to respond to several survey questions that get at the issue of whether school employees are working to meet their needs. Parents were asked: Do administrators, teachers, school support staff, and bus drivers treat you with courtesy? Do they respond promptly to your requests? Have the schools increased their efforts to try to meet your childrens' needs? Do you feel that the classes your children took this year will help to prepare them for next year's work? Parent responses are found in Table 7.

Do the schools' next-in-line customers, the students, feel that their needs are being met? That question was not asked of students directly, but questions that get at that were asked. "Do administrators, teachers, school support staff (secretaries, custodians, cafeteria workers), treat you with courtesy and fairness? Are teachers willing to give you extra help when you need it? Do you feel as a customer of the school that you are being prepared academically for the work you will do next year?" A compilation of the responses to these questions is found in Tables 8.

On the survey indicators of parental satisfaction, parental agreement ("yes" responses tallied) on the various customer service items ranges from 79% to 94%. In order to compute the agreement or "yes" vote on the student customer satisfaction items, the "Strongly Agree" and the "Agree" columns are added for each item. Because the Likert type scale was used with students, there may be some "yes" (and some "no") tallies hidden in the "unsure" count. Student agreement tallies on the various customer satisfaction items ranged from 52% to 80% for high school students, 67% to 87% for elementary.

Table 7. Do Parents Agree With School Division Associates' Self Assessment That They Have Increased Efforts to Meet External Customer Needs?

"In your dealings with school staff do they treat you with courtesy?"

	Yes	No
Supt's Staff?	83.72%	2.33%
Principals/APs?	94.32	3.41%
Teachers?	82.56%	1.16%
Bus Drivers?	83.53%	5.88%

"Have the schools increased their efforts to try to meet your children's needs?"

	Yes	No
Parents' reponses	79.35%	15.22%

"If you make requests of school employees, do you receive prompt replies?"

	Yes	No
Parents' responses:	78.82%	8.24%

"Do you feel that the classes your child took this year will help prepare him/her for next year's work?"

	Yes	No
Parents' responses:	84.69%	8.25%

Table 8. Do Students Agree With School Division Associates' Self-Assessment That They Have Increased Efforts To Meet Customer Needs?

"The (School Staff) treats me with courtesy & fairness"

	Yes	No
Supt.'s Staff	62%	11%
Principal/AP	74%	15%
Teachers	61%	21%
Support Staff	78%	12%
Bus Drivers	62%	22%

"I Feel That I Am Being Prepared For the Work I Will Be Doing Next Year"

Gr 8-12	55%	24%
Gr 4-7	75%	9%

"Teachers Are Willing to Give Me Extra Help When I Need it"

Gr 8-12	61%	19%
Gr 4-7	81%	10%

Evidence suggests that parental agreement (79-94%) with individual customer satisfaction items on their survey more closely approximates associates' self assessment (85%) of increased efforts to serve external customers. The level of student agreement (52-87%) with customer satisfaction items on their survey is somewhat lower than either the parent ratings or the associate self assessment. The difference may be attributable to the fact that the "customer contact" employees (teachers, drivers, principals, etc) work more closely with students than with parents.

Are the main beneficiaries of the school's educational services, the students, really satisfied that their needs are being met by the individual school / school district? Also, a related question is do students feel that they have a responsibility to do quality work, in other words to help produce, or coproduce, their education?

QCSIE Scale Scores

Three scaled scores were derived for each student responding to the survey to help answer the questions about student customer satisfaction and their willingness to coproduce: a) An overall student TQM score called QCSIE-T; b) A student customer satisfaction score called "Quality Customer Service Index for Education" (QCSIE-1); and c) A coproduction score titled "Quality Coproduction by Students Index for Education" (QCSIE - 2).

The scores were determined by the following methods:

QCSIE-T : Responses to 14 of the first 15 items (omit questions 12) on the Student survey (appendix D) were computed for each student. The total possible responses on the Likert scale: 1= "Strongly Disagree" to 5= "Strongly Agree" range in value (if a response is given to each item) from 14 to 70 with an average possible score of 42. Individual scores that fall between 43 and 70 reflect a positive student response by the student to the 14 items. Those that fall between 14

and 41 reflect a negative response. These items include responses to students' awareness about TQM, responses about students' efforts to produce their own quality education, and responses about how well the school is meeting their needs. QCSIE-2 is a student's total "TQM score."

QCSIE-1:Responses to a subset of eight questions (7,8,9,10,11,13,14,15) on the student survey were computed for each student. The total possible responses on the 1 to 5 Likert scale range from 8 to 40 with an average possible score of 24. Individual scores that fall between 25 and 40 reflect a positive student response to the 8 items, or a sense that the student feels that his needs are being met by the school. Individual scores that fall between 8 and 23 reflect a negative student response, and are a reflection that student feels his needs are not being met. The score derived for each student is a scaled indication of how well the student feels his customer needs are being met by the school.

QCSIE-2: Student survey questions 1-6 include four items that ask students to rate their input to the coproduction of a quality education. The total possible responses on the 1 to 5 Likert scale range from 6 to 30 with an average posible score of 18. Scores from 6 to 17 indicate a negative student response or low self rating on coproducing their education. Scores ranging from 19 to 30 reflect a positive student response to the coproduction question. A coproduction score for a student is viewed as his level of willingness to help produce a quality education for himself.

Scores are arrayed in Table 9 by numbers of students who scored in the positive and negative ranges for each scale Q-T, Q-1, and Q-2. Responses to the QCSIE-T scale were aggregated for the district as a whole and for each of the two schools. These may be viewed as total TQM indicators for the groups of

respondents and for the institutions. Numbers of positive and negative scores on the QCSIE -1 scale were tabulated for students in each school and for the school district to reflect levels of customer satisfaction for each school and for the district. Numbers of positive and negative responses on the QCSIE-2 scale were similarly tabulated for students in each school and for the school district to ascertain student willingness to help produce their own education.

Table 9. QCSIE-Scales give a by-school and district-wide percentageof students who scored in the negative, average, and positive ranges for each scale. The percentage scores may be considered the school-wide and district-wide Q-scores.

Scale & Population	% w/ Neg Scores	% w/ Avg* Scores	% w/ Pos. Scores
Q-1= Total TQM Scale	**Range =14-41**	**Range =42**	**Range=43-70**
Gr. 4-7 Students	8.81%	0.38%	90.80%
Gr. 8-12 Students	15.38%	4.17%	79.81%
All Students	12.39%	2.44%	84.82%
Q-2=Customer Sat Scale	**Range =8-23**	**Range=24**	**Range=25-40**
Gr. 4-7 Students	11.88%	2.30%	85.44%
Gr. 8-12 Students	23.40%	3.85%	72.12%
All Students	18.15%	3.14%	78.18%
Q-3=Coproduction Scale	**Range =6-17**	**Range=18**	**Range=19-30**
Gr. 4-7 Students	3.07%	2.68%	93.87%
Gr. 8-12 Students	10.58%	5.13%	83.65%
All Students	7.16%	4.01%	88.31%

Notes: *Average of the possible scores

Internal Reliability of the QCSIE Scales

Cronbach's coefficient alpha was used on each of the three QCSIE scales to determine internal reliability. Fifteen student surveys were selected at random from the total of 573. The results are: QCSIE-T has a reliability coefficient of .72; QCSIE-1, .68; and QCSIE-2, .78. These are moderately strong estimates (coefficient alphas) of internal reliability of the instruments.

Means

The means of the Q-1 scores are a) grades 4-7 = 53.80, b) grades 8-12 = 48.83, and c) total = 51.09. Q-2 means are a) grades 4-7 = 30.27, b) grades 8-12 = 27.18, and c) total = 28.59. Q-3 means are a) grades 4-7 = 23.56, b) grades 8-12 = 21.64, and c) total = 22.52.

Correlations of QCSIE-Scales

Correlation coefficients for grades 4-7 Q-T (total TQM) and Q-1 (Student Customer Satisfaction) scores are .952 with an R-squared of .907. For grades 8-12 on Q-T and Q-1, R=.944 and R-squared= .89. Total Q-T scores have a correlation with Q-1 scores of .951 and R-squared of .905.

Correlation coefficients for grades 4-7 Q-T (total TQM) and Q-2 (Student Coproduction) scores are .819 with an R-squared of .671. For grades 8-12 on Q-T and Q-2, R=.859 and R-squared= .737. Total Q-T scores have a correlation with Q-2 scores of .854 and R-squared of .73.

Correlation coefficients for grades 4-7 Q-1 (Student Customer Satisfaction) and Q-2 (Student Coproduction) scores are .616 with an R-squared of .38. For grades 8-12 on Q-1 and Q-2, R=.641 and R-squared= .411. Total Q-1 scores have a correlation with Q-2 scores of .657 and R-squared of .432.

Diff Scores

Responses to question 16 on the student survey were then used to determine a classroom subjects' "Diff Score" for each student. Question 16 (see Appendix E) requested students to rate the difficulty of each school subject taken on a Likert scale ranging from 1= "Too Easy" to 5= "Too Difficult" as an estimate of how well the subjects met their needs. Because students took different quantities of subjects, the Diff Score for each student was derived by summing all of a student's responses and dividing the total by the number of subjects he took to produce an average difficulty score for each student. Since the range of possible scores is 1.0 to 5.0, the average of the possible scores is 3.0. Student "subject difficulty " scores ranging from 1.00 to 2.99 are in the "easy" range. Scores ranging from 3.1 to 5.0 are in the "difficult" range. See Table 10 for the district's Diff Scores.

Imp Scores

Student responses to survey questions 17 = "What has improved about the school / school district" and 18= "What would you improve about the school / school district?" were tabulated. Indvidual student responses on these items ranged from 0= "nothing" to 7. The open-ended total for each student depended on his perceptions of how many things he felt had improved or needed to be improved in the school. Question 17 responses were given a positive valence and tallied for each student. Individual student responses to question 18 were then tabulated and given a negative valence. Each student's positive and negative scores on these two items were then totaled to attain the Imp Scale value (ie a +2 and a -4 = -2).

Diff scale scores and Imp scale scores are arrayed in Table 10. The percentage scores in the table can be considered school and school district scores on

Table 10. Two scales related to customer satisfaction of students: Diff Scores (a student's average rating of the difficulty of his subjects) and Imp Scores (a student's composite view of things that have improved compared to those things still needing improvement).

Scale & Population	% with "Easy" Scores	% w/ Avg. Scores	% w/"Difficult" Scores
Diff Scores	**Range=1.00-2.99**	**Range=3.0**	**Range=3.1-5.0**
Gr. 4-7 Students	66.28%	11.11%	21.84%
Gr. 8-12 Students	56.41%	14.10%	28.85%
All Students	60.91%	12.74%	27.23%

Imp Scores	% With negative scores	"0" scores	% With positive scores
Gr. 4-7 Students	32.95%	35.25%	31.03%
Gr. 8-12 Students	45.19%	35.26%	18.91%
All Students	39.62%	35.25%	24.43%

these measures as perceived by students.

Students with "easy" Diff Scale scores outnumber those with "difficult" scores by a 2-1 margin. The margin in grades 4-7 is more like 3-1. On the Imp Scale scores, for every student that has a score with a positive valence indicating that he feels more things have improved than need improvement, there are 1.7 students with negative valence scores denoting they feel that more things need improvement. Relationships between the three QCSIE scales (TQM scale, Student Customer Satisfaction scale, and Student Coproduction scale) and the Diff and Imp scales will be explored in the discussion chapter.

Empowerment

Finally, do the associates of the Rappahannock County Schools feel empowered as a result of the installation of TQM as the process for improvement in the district? Are there differences in feelings of empowerment among certificated, administrative / school board , and classified associates? Does it make a difference whether the associates perceive they volunteered for training or not?

Study participants were asked on the empowerment issue: "Have you had an increased role in improving things in the Rappahannock Schools since quality management was fully implemented two years ago?" Sixty-six percent of associates responded "yes", 28% "no", and 6% gave no response. Certificated associates responded 67% "yes", 33% "no." Administrative and school board associates responded 100% "yes." Classified associates replied 53% "yes," 29% "no," and 18% gave no response. Of the 18% of classified associates not responding to the empowerment question, 71% had not been TQM trained.

Associates who reported that they had volunteered to receive TQM training gave the largest positive response to the empowerment question: 75% reported they

had experienced an increased role in improving things in the school system since implementation of TQM, 22% had not, and 3% didn't respond to the question. For the conscriptees, 41% said "yes," 55% "no," and 4% didn't respond. For the non-TQM trained, 67% said "yes," 7% "no," and 27% no response. Specifics on how associates used their new-found empowerment are found in the discussion chapter.

Positive Outcomes of Quality Management

Have there been positive outcomes from the implementation of TQM in the Rappahannock County Schools? Associates responding replied "yes" 75%, "no" 10%, and 15% didn't respond to the item. Certificated associates replied 89% "yes," and 11% "no." All administrative and school board associates replied "yes." Classified associates responded "yes" 39%, "no" 13%, and 47% gave no response to the item. Of the 47% of classified associates not responding to the positive outcomes question, 71% had not been TQM trained.

Eighty-two percent of self described volunteers-for-TQM training reported that they had seen positives from implementation of TQM, 8% had not, and 10% didn't respond to the item. Of those who felt that they had been required to undergo TQM training, 71% agreed they'd seen positive outcomes, 18% had not, and 11% did not answer the question. Of the few untrained associates, 44% reported seeing positives, 12% not, and 44% no answer. A full discussion of the positive outcomes of quality implementation and associates' suggestions for improving implementation of TQM in the school district can be found in the discussion chapter.

Answers to the remaining questions below will be provided and discussed in the next chapter "Discussion," because these items are determined by means other

than the survey instruments found in the appendix.

- Are certificated associates using quality strategies to improve instructional services to customers?
- Is there evidence that instructional services have improved as a result of use of quality strategies?
- Are classified and administrative associates using quality strategies to improve support services to internal and external customers?
- Is there evidence that support services have been improved as a result of use of quality strategies?
- Is there evidence that the market-share of customers served by the Rappahannock County Schools has increased since the inception of quality management in 1990?

Discussion

What are the effects of the implementation of Quality Management on the Rappahannock County, Virginia Public Schools? The results of the study presented in the previous chapter and the additional evidence presented in this chapter suggest that TQM implementation is on schedule and at near capacity use, that the way many associates do their jobs / work with people has changed as a result of TQM training, parents feel the school district associates have increased their efforts to meet their children's needs since inception of TQM, and that use of TQM processes has produced moderatee improvements in student outcomes and support services.

Has TQM training / implementation really made a difference in the way associates do their work with student, parent, and fellow associate customer groups? And what are the outcomes? Are there significant improvements in the Rappahannock County Public Schools as a result of three years of TQM?

Did TQM Training Change Associates?

Associates responding to the study give conflicting reports on the issue of whether TQM training has made a difference in the way they work with people. Six percent said "I didn't need quality training to give me good skills in meeting people's needs. I was already that way!" In all, 50%, one of every two responding associates answered in the affirmative to the question: "Has the way you relate / work with people changed as a result of the training?" Yet when asked what aspects of the TQM training they had used in their work ("with people" implied), 89% gave examples.

Also associates did differ in their responses to the "did you change" question depending upon whether they are certificated or classified, and upon whether or not

they perceive they volunteered to receive the 30+ hour TQM training. The proportions for the certificated and the classified groups were both 48% "yes. I did change as a result of TQM training," and 52% "no, I didn't" or "I was already like that," however, the combinations were different depending upon whether or not associates perceived they had volunteered for quality training.

Of those certificated associates who reported that they had volunteered for the quality training, 57% stated that they had changed as a result of training and 43% that they had not changed. Of those certificated associates who reported that they "did not volunteer" for the quality training they received, a mere 22% said that the 30+ hour training experience had changed the way they worked with others, while nearly 80% of the non-volunteers said that the training had no such impact on them.

Conversely, for the classified volunteer group, 39 % reported that the way they relate / work with people changed, 61% that they had not. Of the group of classified associates that didn't volunteer for the training, 65% reported that they had changed, 35% that they had not.

It appears, based on the above, that while 48% of classified and 48% of certificated associates admitted that TQM changed the way they worked with others, the two groups were very different in their responses depending on the members' perception of whether or not quality training had been a voluntary experience. For certificated staff, the percepton of volunteering appeared to color whether or not they thought the training had made any difference. For those who perhaps felt coerced to participate in the training, a 4-1 margin disagreed that the training had changed them in any way. For classified, it was almost the reverse: a 2-1 margin of the "coerced" felt the training had made a difference. Perhaps there are correlations

with educational levels of associates that would help to explain these differences, but that information was not requested in the demographic data.

Related to the "have you changed as a result of TQM" is "have other associates changed?" For example, when asked "have you increased your efforts to meet your coworkers' needs," 85% replied yes. But when asked if coworkers had been attentive to meeting their needs, surprizingly 13% fewer associates, 74%, felt that others had increased their efforts to meet their needs as internal customers.

Fully 85% of associates reported increasing their efforts, since the inception of TQM, to meet the needs of external customers: the schools' students and their parents. Correspondingly, 79% of parents responding agreed that district associates had increased efforts to meet their childrens' needs. While students weren't ask to rate school associates on change since the inception of TQM, 78% of all student respondents had positive QCSIE-1 scores indicating that they felt that their needs were being met.

The above numerical evidence supports the assertion that associates of the Rappahannock Schools have indeed changed the way they work and even improved their services to their customers as a result of the implementation of quality management.

But numbers can't tell the entire story. What did the 795 staff, student, and parent survey respondents say relative to TQM changing the way associates do their jobs including the way they work with people. Related comments are reported by respondent group below.

Faculty and Staff tell how TQM training/implementation has changed the way they and other associates work with people:

•Central office administrators are trying harder to learn customer requirements.

•Central Office administrators have increased awareness of staff as customers, but more attention is needed to meet our requirements.

•The Central administration is trying hard to make improvements, but not to my felt needs.

•I feel like I'm here more to serve parents and students.

•Continuous improvement means meeting one another's needs.

•Thinking about students and parents as customers improves my focus.

•I spend a lot of time trying to prevent problems.

•I've improved myself to help parents and students.

•I do more analysis particularly with data before I try to solve problems.

•I'm more aware of the consequences of my actions on others.

•I used Quality techniques to guide students through the democratic process.

•Quality model causes me to reflect on my professional experience using a new paradigm.

•Quality training helped me to view us all as part of one family, part of a team.

•I see myself as part of a whole now.

•Quality provides a framework to understand customer's requirements.

•With this you can ask questions without criticizing.

•Has made me aware of the importance of trying to do the best I can.

•Quality has increased my sensitivity to co-workers needs and to helping to make the overall work flow smoother.

•So much time spent on improvement that I'm too tired to teach.

•I remember to always try to satisfy my customers. They keep me in business.

•I keep the quality Problem Solving Process in mind as I solve all kinds of problems.

•I learned through quality to blame the situation, not the person.

•To make sure my students learn as much as possible in the best way, I used several ideas from Quality training.

•I have more awareness of others in the system.

•Helped in my classroom organization.

•I'm making my job customer-driven.

•I am a more demanding consumer of service.

•Required quality makes me grouchy.

•It's easier to give and accept constructive criticism with this process. People don't take affront.

•I have video-taped students for their parents to help the parents understand better how their children are doing in school.

Elementary student respondents tell how the way associates work with them has changed

•Teachers are nicer to the students.

•Teachers help us more.

•Teachers and staff, the way they treat us better.

•Teachers have shown more interest in explaining work.

•Teachers' attitudes towards work and their teaching styles.

•More extra help.

•The atmosphere of the school. I feel that teachers try to help us more.

•I think the teachers are nicer and have improved.

•Teachers treat you with more respect now.

•That teachers work with their kids a bit more.

•The kindness and quality of education.

•The whole school.

High School students' comments

•The kindness of teachers has improved over the last two years.

•Teachers' disposition.

•Teachers take more time to help you understand the work.

•The quality of the school.

•The courtesy of the teachers has improved over two years.

•Teachers give more outside help.

•Respect towards individuals.

•The teacher assistance.

•The way that people have been nicer.

•The last two years what's improved is the kids attitude against the school.

•I think the way school is being conducted has improved.

•Teachers are more willing to listen.

Note: The huge majority of student perceptions about what has improved tend to focus more on the tangible: sports, food, certain classes, certain teachers, computers, drink machines, etc.

Parent respondents tell how associates have changed

•Our personnel are learning teamwork and how to get involved.

•There is risk taking with the 4th grade curriculum.

•I like the way everyone tries to work together.

•You can sit and talk over problems with teachers, principals, the superintendent

•Things seem to change every day. Most employees try hard to make improvements.

•Students are being treated more like individuals.

•More consistency and care among teachers.

•More emphasis on the kids; administrators more available.

•Employees are more attentive to the public.

•Something must be happening to make the principals and teachers more aware of the students and their needs.

•My child is more interested in school. Leads me to believe teachers are taking more time with the students.

•Your teaching staff is excellent with fewer turnovers the last few years

•providing improvement and continuity.

There is little question that the associates of the Rappahannock district are operating very differently than they did three years ago. Treating people like customers seemed anathema to some of these educators at first, but appears second nature to many 12 - 24 months following quality training. The numbers tell that associates are working in a changed way with people, and comments substantiate it. Some associates said that they were treating people fairly well without quality training, and they probably were. Three out of every four study participants say associates are doing an even better job of working with people than before quality management.

Empowerment

A correlate of the changed way that associates do their work is the element of empowerment. Do Rappahannock School district associates feel that they have a greater role in decision-making or is TQM in Rappahannock another form of "business as usual."

Study participants were asked on the empowerment issue: "Have you had an

increased role in improving things in the Rappahannock Schools since quality management was fully implemented two years ago?" Sixty-six percent responded in the affirmative. A breakdown of the positive responses: certificated associates 67% , administrative / school board associates 100%, and classified associates 53%. It is unclear why fewer classified associates feel empowered, unless it lies in the fact that of the 10% untrained associates in the school district, 80% are classified.

Associates who reported that they had volunteered to receive TQM training gave the largest positive response to the empowerment question: 75% reported they had experienced an increased role in improving things in the school system since implementation of TQM. For those identifying themselves as not choosing to participate in quality training, only 41% said they had an increased role in improving things. Again, it is unclear why there is a significant difference. It can be hypothesized that those who felt forced to undergo the training had less interest in investing themselves in the process to help improve things. Or perhaps they felt TQM was another form of top down management in disguise.

Associates who reported feeling empowered by the training / implementation gave the following examples of how they were empowered: 73% said they served on quality improvement teams that "made a difference," 8% indicated that improving themselves professionally through the TQM training gave them an enhanced role in improving the system, and an additional 16% felt an increased awareness of the rest of the system through TQM training helped give them opportunities for more input. Associates shared anecdotal information about their increased opportunities to change things in the district. Note that not all associates feel empowered.

•Central administration is open to meeting customer needs. Also, there are no dumb ideas. We are heard.

•Our building administrators have replaced the "no option" plan with quality principles.

•Reinforce Quality model so that employees' opinions are not over-ruled.

•Quality originates at firing line, not top down.

•Why do the building administrators have to check with central office administrators before making a decision. I thought quality was empowerment.

•For the first time, most teachers have had input in some areas of educational improvement.

•Cooperative groups really work and help to allay concerns about who makes the decisions.

•When a decision has to be made I have a voice.

•Involvement gives us workers ownership and makes us happier.

•Things change more efficiently and with consensus.

•We're more involved with the goings on of the school system.

Are associates really empowered? We know that 66% of associates who participated in the study feel they have an increased role in improving things in the district since the implementation of TQM. Does that mean they have more power than under the old system? And what of the other 34% ? Are we certain that quality management hasn't enabled this group to help improve things?

The facts suggest that 100% of the district's associates may volunteer to serve on quality teams to solve a wide range of problems involving numerous important decisions. Over 60% have actually volunteered at one time or another to serve on a quality team.

Additionally, 100% of associates did in fact serve on required quality improvement teams during 1992-93. Some apparently view this as a loss of power, rather than becoming empowered. Yet it appears that required quality is another opportunity for 100% of associates to have an active role in the premier formal decision-making process in the district, whereas previously only the school board, administrators, department / grade level chairpersons, and the few employees that served on traditional committees had formal roles in deciding how things would change or improve.

Quality procedures in use by the district require that decisions be the result of quality team members reaching consensus, meaning presumably that each member agrees to support a team decision even if it isn't his or her own first choice. In cases where a group is trying to solve a problem that isn't totally within its control, its decisions may require getting commitment from others before implementation: the rest of the group affected by the decision, or perhaps the administration and/or the school board, or perhaps the school board attorney.

Satisfied Customers

Perhaps the most critical queston to be answered in a study of the effectiveness of TQM in an organization is: "Do we have satisfied customers?" Associates of the school district give mixed reviews on whether they are satisfied (internal) customers. Eighty-five percent report trying harder to meet fellow workers' needs, but only 74% say that other associates have increased their efforts to meet their needs.

It can be hypothesized that school district employee satisfaction is only as good as the perception employees have about how they are being treated by administrators. In this study, associates weren't asked if they were well treated.

They were asked if various administrative staff had increased their efforts to meet their needs. Seventy-two percent said they had. Even 67% of those who were made to participate in quality training said they had.

If one accepts the notion that a satisfied internal customer will try harder than a dissatisfied one to meet the needs of external customers, then a 2 or 3 - 1 ratio of satisfied internal customers may not be good enough. An interesting correlate study would be to see if measures taken to drastically improve internal customer satisfaction would reap benefits in external customer satisfaction.

Students

To what degree do the primary recipients of the school's educational services, the students, feel their needs are being met by the school / school district? QCSIE-1, the student customer satisfaction scale, provides a measure of the degree to which a student feels his / her needs are being met. In this study, 78% of the district's 573 student participants had positive Q-1 customer satisfaction scores, meaning that they had scored above the average of the possible scores. Seventy-two percent of high school students and 85% of elementary students had positive Q-2 scores.

But what of the other 22% who scored at the average or in the negative range? Is a 4-1 satisfaction ratio acceptable? One percent of Q-2 respondents scored three standard deviations below the mean (see Figure 3). Seven percent scored two standard deviations below the mean. It appears that eight percent of students are very unsatisfied. The remaining 10% of the marginally dissatisfied can be found in the minus one standard deviation band which includes the three percent that scored at the average of the possible scores, 24.

Are all of the satisfied 78% completely satisfied? The distribution shows

that 7% scored two standard deviations above the mean of 28.6 and that an additional 24% scored one standard deviation above the mean. And the mean is 4.6 points higher than the average of possible scores: 24. This may be construed to mean that of the 78% satisfied student customers, 31% are very satidfied, and the remaining 47% are moderately satisfied. Of those, 43% can be found in the zero standard deviation band. The one standard deviation below the mean contains the average of the possible scores, 24. Therefore, within that band can be found the other 4% of marginally satisfied students.

High school students' with negative customer satisfaction scores nearly double those of elementary students, 23% to 12%. Not surprisingly, high school students also have more negative Imp. scale scores 35% to 22%. A negative Imp scale score denotes the student feels more things need improvement than have improved.

It's unclear from the data whether a satisfied student is one who perceives he has difficult or easy classes. High school students have a higher percentage of Diff scale scores in the difficult range: 29% to 22% for elementary. But there seems to be no pattern to the interpretation. One student seems to be satisfied because he perceives educational services are getting more rigorous. Another complains because his work is way too hard. What's a dissatisfier for one is a satisfier for another.

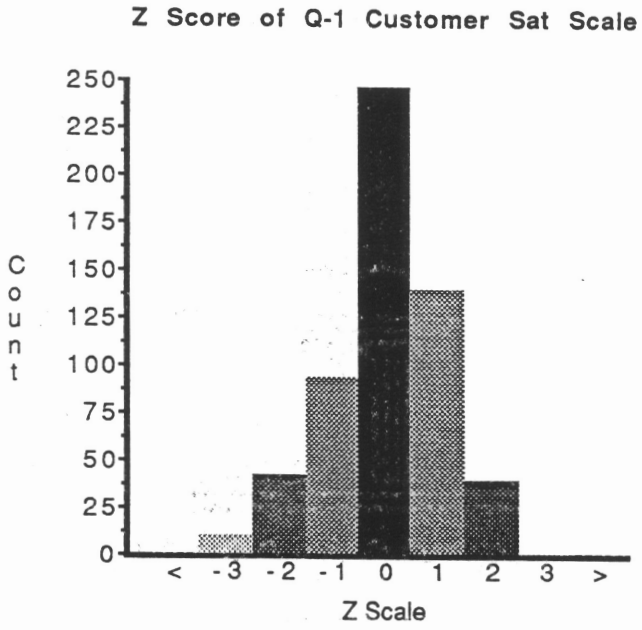

Figure 3. Distribution of QCSIE-1, student customer satisfaction scores. Scores above 24 (average of possible scores) indicate satisfaction with the school district's services. The mean of actual scores was 28.60 with a standard deviation of 5.57.

Students are perhaps the least enfranchised group studied. It is evident that some teachers are teaching students some elements of TQM training and that some are surveying students to see how they feel, yet there really is little evidence that students have any major role in helping to improve the school district. If given a chance to participate on quality improvement teams, perhaps students will respond like the associate who said "involvement gives us workers ownership and makes us happier."

Parents

Parents also seem relatively satisfied; 79% of respondents feel that school district associates have increased their efforts to meet their children's needs. School staff receive approval ratings ranging from 84% to 94% on courteous treatment of parents. Eighty-five percent feel that their children are well prepared for next year's work.

The results of the three years of Parent Customer Survey data (See table 11) show a gradual, but not significant, increase in parent satisfaction with the district's services at the elementary level. At the high school level, the 1993 survey had to be redone due to insufficient respondents.

A significant element of future parental satisfaction may very well be the opportunity for parents to have a greater role in helping to improve the school district. Fifty-five percent of parents responding say they have filled out surveys related to improvement of school services in the last two years, but a 2-1 margin feel they haven't had an increased role in improving the schools. To rectify this, more parents will need to know about and volunteer to serve on quality improvement teams. To be more productive team members, parents should be provided training in TQM.

Table 11. Three Years of Parent Satisfaction Ratings As Surveyed by the District August 1991, 1992, 1993 Customer Satisfaction figures expressed in means with 5.0=strongly agree and 1.0=strongly disagree.

	1991	1992	1993
2. The various programs (i.e. reading, math, science, etc.) of the Rappahannock County Public Schools meet the needs of my children.	HS Means 3.8 ES Means 3.9	3.8 3.8	TBA 3.8
3. There is open communication between our childrens' teachers, administrators and the family.	HS Means 3.8 ES Means 4.0	3.6 4.1	TBA 4.1
4. The cleanliness of the school buildings and grounds is acceptable.	HS Means 3.8 ES Means 3.7	3.8 3.8	TBA 3.9
5. Discipline in the Rappahannock County Public Schools is fair and consistent.	HS Means 3.4 ES Means 3.7	3.5 3.6	TBA 3.7
6. The major emphasis of the Rappahannock County Public Schools is a strong academic education of its students.	HS Means 3.7 ES Means 3.7	3.6 3.9	TBA 3.8
7. Parents and students are dealt with by school personnel in a friendly and respectful manner.	HS Means 3.9 ES Means 4.1	3.8 4.0	TBA 4.1
8. The transportation services that are offered by the Rappahannock County School Board are excellent.	HS Means 3.6 ES Means 3.2	3.7 3.4	TBA 3.7

Notes: Items 1, 9, 10 are not the same on all three surveys, thus are omitted. The 1993 High School (HS) survey response rate was too small and is being re-surveyed.

Coproduction

Because the quality of any school's educational services is at least partially dependent upon the student customer receiving and acting on the services, an important issue is whether students feel that they have any responsibility to do quality work. In other words are they willing to help produce, or coproduce, their education? Eighty-eight percent of Rappahannock County students have positive QCSIE-2 student coproduction scores. Elementary students outrank high school students on positive coproduction QCSIE-2 scores by a 94% to 84% margin. High school students outdistance their elementary counterparts by almost 4-1 on negative coproduction scores, 11% to 3%.

Is there any relationship between customer satisfaction and coproduction? Is a satisfied student one who is more willing to coproduce his education? A linear regression was used (See Figure 4) to determine how strong the relationship is between scales Q-1 and Q-2, between a student's perception of how well his customer needs are being met by the school on the one hand, and how committed he is to help produce his own education on the other.

It was found that 43% of the variation in student willingness to coproduce their education (Q-2) could be explained by student customer satisfaction scores (Q-1). Student scores on the Imp scale (how school has improved / needs to improve) andi on the Diff Scale were factored into a multiple regression. By themselves, Imp Scale scores account for 4% of the variation in student coproduction (Q-2). Also, by themselves, the Diff scores account for 6% of the variation in student coproduction. The three factors (Q-1, Imp scale, and Diff scale) combined in a multiple regression, however, account for 45%, not 53%, of the variation in Q-2.

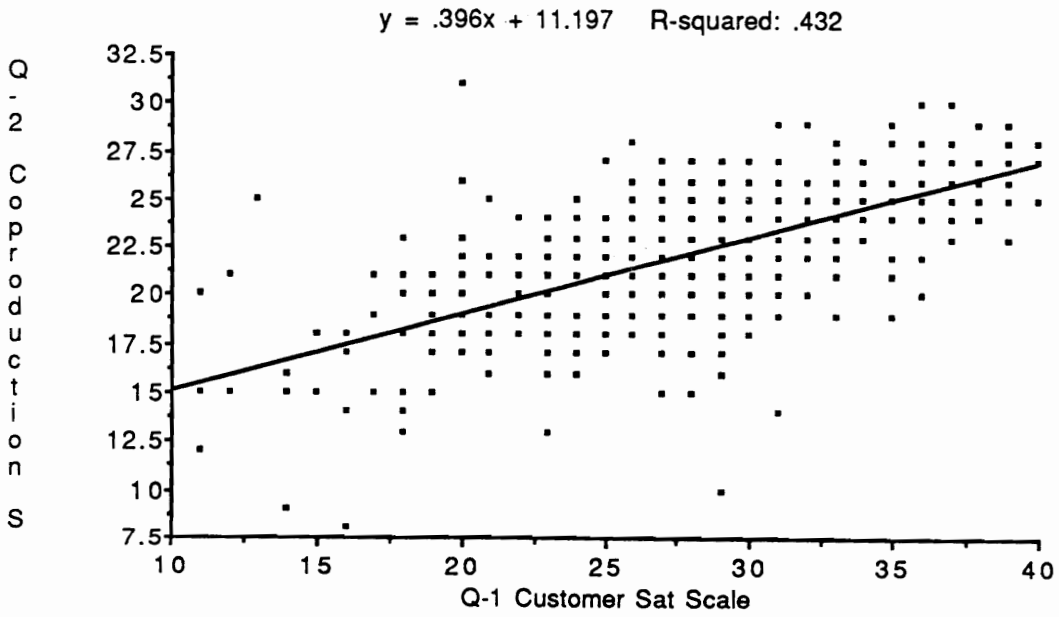

Figure 4. A simple regression shows how much of the variation in district-wide student willingness to coproduce their education (QCSIE-2) can be explained by student customer satisfaction (QCSIE-1).

Improve Implementation of Quality

How would associates improve the implementation of TQM in the district? Study participants were asked to respond to the question: "Would you improve anything about the implementation of quality? If so, what?" Eighty-one percent responded "yes." Suggestions for improvement of the TQM implementation process were: make participation on quality improvement teams purely voluntary, 15%; provide additional time for quality team meetings, 12%; halt administrative vetoes of quality team decisions, 6%; stop assigning problems and parameters, 5%; train students and parents, 5%; ensure that administrators buy-in to quality management and cease giving lip service, 2%; tell associates what quality management has improved in the district, 2%; stop top down implementation, 2%; and put more emphasis on meeting needs of internal customers, 2%. The concerns about the administrative role in the implementation of quality management in the district is further illuminated by some of these comments on the associate surveys about improving the TQM implementation process:

- Find a way to make sure new teachers' views don't get overlooked.
- You must create a fear-free emotional support climate which is not yet present.
- There needs to be more publicity about what is being done with Quality management in this school system.
- Train school board members.
- Relieve all the pressure to measure.
- Volunteerism must be the cornerstone of Quality, other-wise, this too will die.
- Get the associates who do all the complaining to serve on quality teams to solve those problems.
- All quality teams should report to the faculty.

•Use Quality process to make more decisions.

•There needs to be a better understanding by administration as to which issues should be solved with Quality and which with traditional decision-making.

•Set up a "Quick Quality" process.

•Trust it more. Read Glaser's book & see if that helps get Quality all the way through.

•Demand involvement by all teachers and provide time.

•Quality techniques are not helping to improve education. They're too artificial and the process takes too long.

•Better prepare students for their roles after graduation. This is where our product (education) is so severely judged.

•Stop re-wording opinion surveys to meet administration's needs.

•Building administration needs to remember that the teacher is a customer.

Parents also listed some ideas on their surveys for improving the implementation of quality management:

•Some have made efforts to improve, but administration must demand excellence.

•Student evaluations would be invaluable

•I appreciate being surveyed. Why don't you survey parents/students who leave high school before graduation to see if school is meeting their needs.

•Parents not involved, and need to be.

•Don't treat students as though they are the enemy. They are the customer.

•Some staff need to stop complaining, and stop talking about coworkers in community ,and act professional.They can't meet our needs like they are.

•I was unaware I was able to participate in the quality improvement process.

•Put more emphasis on students doing complete, higher quality work.

•Certain departments must do a better job of preparing kids for college.

•Allow parents and students to evaluate teachers.

•All improvement efforts seem focused on the elementary school. That needs to change soon.

•Administration is trying to improve, but there is not enough teacher involvement by volunteering .

Should the quality management implementation plan in the district improve ? Without question, any process built squarely on a concept called "continuous improvement" would have a predisposition towards improvement. Is there any consensus after two full years of quality management implementation about how the process should improve ? There is agreement among most parents in the study that they should have a greater role in improving thoings in the district. Only 31% feel they have a greater role than before.

Other than greater parental involvement in the process, no other ideas for improving TQM in the district had a significant following. Making the process less administrator-directed, eliminating required quality, providing time for quality meetings, providing training for parents and students, and putting more emphasis on internal customer needs all garnered 15% or less of associate's suggestions on how the process should be improved.

Quality teams work to improve instruction and support services

Are certificated associates using quality strategies to improve instructional services to customers? If so, what evidence is there that it is doing any good? Are classified and administrative associates using quality strategies to improve support

services to internal and external customers? If so, is there evidence that these support services are improving as a result? Table 12 enumerates the results of the required and voluntary quality team "continuous improvement" efforts between 1991 and 1993.

In most cases, teams used the TQM problem solving process learned in training. The table states the problem in the gap-establishing format of "As-Is" and "Desired State;" omits the 2nd and 3rd steps of analyzing the problem and generating solutions; lists a synoptic view of the solution selected; omits the implementation plan; and lists the evaluation / outcome. Whenever a "TBA" is listed, that team's first evaluative efforts have not yet been completed. In many cases, especially where a team has yet to close the gap between the "As-Is" and "Desired State," a team may recycle the process to find better processes to achieve the "Desired State."

One example of re-cycling is the "Transportation Parent Satisfaction" team, the first and longest running quality team in the district, which began its work in fall 1991 to address 34% ("As-Is") elementary parent dissatisfaction with the transportation services as measured by the Customer Satisfaction Survey in August 1991. The team set a "Desired State" of less than 10% dissatisfaction. By August 1992, the survey measured 26% parent dissatisfaction, so the quality team kept working. The August 1993 figure is 11% (a 68% drop in parental dissatisfaction from 1991), so the quality team of teachers, drivers, parents, students, and administrators will continue to work to find ways during the 1993-94 school year to reduce dissatisfaction below the "Desired State" target of 10%.

Table 12 contains evidence that the district assigned each associate to one of 33 quality teams for the 1992-93 year, some to improve instructional services, others

to improve support services. The table also identifies 10 of the voluntary quality teams that have been established to address problems or to improve / establish processes as needs are identified by internal or external customers.

What have the teams accomplished ? Have the educational services of the school district improved as a result of quality team work? The column on table 12 marked "Progress towards Desired State" gives the evaluative results for each team. Ninety percent of all 1992-93 required quality teams that evaluated their progress reported making headway towards achieving their "desired state." Of that number, 45% met or exceeded their "desired state."

Collectively, the academic teams at the elementary level focused their quality team efforts on reducing the number of children identified by normed tests as needing mathematics remediation. Each team analyzed available data to pinpoint "key causes" of children being identified for remedial math services. The teams then tailored instructional processes to use. After the quality teams implemented their solutions to the problem of too many students needing help, the students were again tested in March 1993.

School-wide, the numbers of students identified for remedial math in 1993 didn't show a reduction from the 1992 numbers, however two teams, the fourth grade and the Kindergarten teams, reduced remedial math figures by 35% to 40%. By working to reduce remediation numbers, the district is attempting to lower its cost of providing quality educational services. Each time a student qualifies for remedial services or is retained due to lack of skills, the district incurs re-teaching costs.

Table 12. Quality Team Results 1991-93

RAPPAHANNOCK COUNTY PUBLIC SCHOOLS' REQIUIRED QUALITY TEAM OUTCOMES					/OCT. 1993
Required Quality Improvement	**Problem Statement - "As-Is"**	**Problem Statement - "Desired State"**	**Solution**	**Progress Toward Desired State**	
Teams (1992-93)					
Central Office Customer Service	+50% phone messages not seen within 30 minutes	100% phone messages will be seen within 30 minutes	Message trays installed on admin. office doors	Met Desired State= 100% seen within 30 mins.	
Grade 1	20% incoming 1st graders elig for math remediation	Fewer than 10% will qualif. by end of year	New 1st gr. math curriculum; change elig. test	Some progress made= 18% eligible for remediation	
Grade 2	19% incoming 2nd graders elig for math remediation	Fewer than 5% will qualif. by end of year	Change chapt.seq.; timed tests;Pract. test format	Good progress made=11% eligible for remediation	
Grade 3	80% incoming 3nd graders tested out of math remed.	By end of year at least 90% will test out	Timed tests, pratice test format, games/drills	72% tested out	
Grade 4	30% incoming 4th graders elig for math remediation	Elig. rate will be reduced by 70% by end of year	RJR math, practice change probs horiz to vert	Met Desired State= 70% reduction in elig. for remed	
Grade 5	85% incoming 5th graders tested out of math remed.	By end of year at least 90% will test out	Mastery learning process, teach self monitoring	Some progress made=86% tested out of remediation	
Grade 6	Incoming 6th graders scored 58NPCT on math comp.	By end of year, 6th gr. will score at least 63NPCT	timed drills, tests simulated bubble test format	students scored 57 NPCT	
Grade 7	76% of 7th graders failed to exceed 50% on CR test	All 7th gr. will improve at least 20% by May CR test	Mult. drills, decimal placement, re-align probs	Some progress made= 3-14 raw score increase/sect.	
Grade K	31% incoming K graders elig for math remediation	Fewer than 25% will qualif. by end of year	Extend test pd 1-2 weeks, pract. abstract format	Exceeded desired state=19% are eligible for remediation.	
RCES At Risk Students	21% rem students have rem. math,reading,guidance	By June, only 14 students will need "triple dip"	Each teacher "adopt" 5 triple dippers, etc	Exceeded desired state= only 3 still elig. for triple-dip	
RCES Caf	Individual Classes take 5+minutes to go through line	Individual Classes will take -3 mins go through line	Rotate caf staff work, hold special orders to end	TBA	
RCES Custodial Services	Mowing operations taking staff away from cleaning	Cleaning & mowing will get done	TBA	TBA	
RCES Off. Cust. Services	Thru Feb, 5 unauthorized contacts with students	Mar-June, there will be 0 unauthorized contacts	Sep. form at fee day for parents to detail custody	TBA	
RCES Resource Progs.	30% of pull-out students brought/picked up on time	90% of pull-out students brought/picked up on time	Allow travel time in pullout sched., ring bells	TBA	
RCES Spec. Ed. 1	SpEd students scored aggregate 52% math CR test	SpEd students will scored aggreg. 80% math CR test	Various according to student needs	Exceeded desired state= students scored 82% on CR.	
RCES Spec. Ed. 2	Students mastered 70% math conc on Brigance	Students will master 85% +math conc on Brigance	Various depending on student need	Met Desired State= Students scored 85% on Brigance math	
RCHS Attendance	Per class attendance is approx 84%	Per class attendance will approach 100%	New policy recommended	TBA	
RCHS Caf	Participation rate=45%	Participation rate will improve by 5% Mar-June	Check food avail. for 2ndshift, get + heat lamps	Exceeded desired state= participation increased by 10%	
RCHS Dropout Prev.	Over 50% of long-susp kids not served DO team	90% + of kids in 6-step disc. will be served	DO team will get referrals by 3rd step	TBA	
RCHS Lang. Arts	Students scored an average of 53% on voc. retention	Students score average of 20% + on voc. retention	Various=Each teacher picked approp. strategies	Exceeded desired state= students scored 25-60%+	
RCHS Maintenance	Front lawn poorly kept because of construction	TBA	TBA	TBA	
RCHS Math	Present math offerings don't meet needs non-CB	1993-94 math offerings don't meet needs non-CB	Math & Voc. teacher team teach gr. 8, etc.	TBA- quazi-experimental study in progress	
RCHS PE	80% of 9th gr. health SOLs not covered by text	90% of 9th gr. health SOLs will be covered by text	TBA	TBA	
RCHS Science	21% HS students turn in acceptable Sci Fair project	30%+HS students turn in acceptable Sci Fair project	Incentives,structured format,coach students,etc.	Some progress towards desired state= 22% succesful entries in fair	
RCHS Soc. Studies	50%+ Soc. Stud. students not profic. Charts/graphs	80%+ Soc. Stud. students be profic. Charts/graphs	Students will work with graphs/charts 1/week	TBA	
RCHS Spec. Ed.	86% HS teachers don't have info on SpEd students	85%+ HS teachers will have info on SpEd students	Inservice by team, student profile sheets	TBA	
RCHS Voc. Ed.	60% Voc. studs use newspapers + for current events	95% Voc. studs use newspapers + for current events	Various according to indiv. teacher selection	TBA	
Transpo Bus Evac	Bus evac takes 30+ minutes to complete	Bus evac will take U - 15 minutes to complete	Driver do drills using standardized process	Exceeded desired stateDrills take 10 minutes at HS / 15 at ES	
Transpo Lot Congestion	Each day, several buses block traffic lanes in lot	Each day, no buses will block traffic lanes in lot	Drivers assigned fuel lanes;Park buses not fueling	Good progress to desired state. Mechanics indicate 95% improvement	
Transpo Medical Emerg	Staff unsure how to handle med. emergencies 91-92	100 percent staff will know what to do	Driver team developed procedures to follow	TBA	
Transpo Recognition	Few drivers are recognized for accomplishmants	All drivers will receive recognition	Driver team developed recognition program	100% of transportation associates recognized June 1993	
Transpo Roadeo	50% of transpo. staff participated in Roadeo 1992	90% of transpo. staff will participate in Roadeo 93	Have picnic and awards. Hold on Saturday, not PM	Good progress: Held on rain date in PM. Still had 70 % participation	
Transpo Safety	8 buses passed illegally 1st semester 1992-93	Fewer will be passed illegally 2nd semester	PR to parents, students, newsp. Call-in on radio	Met desired state: 4 buses passed illegally 2nd semester 1992-93	
Voluntary teams (1991-93)					
Building Security	Some unauthorized persons tried to pickup children	Only authorized persons will pickup children	Reminders at entrances; all personnel enforce	Some progress-teachers report big reductions in attempted violatons	
HS Discipline	25% HS parents concerned with fairness of discipline	U-10% HS parents will be concerned with fairness	Preset steps; stiffer penalties	Good progress:1991 to 1992 dissatisfaction fell from 25% to 13%	
K-3 Reporting instrument	Most teachers/parents surveyed dissatisfied	Majority will be satisfied with instrument	New format: mastery instead of grades	Desired state met: 60% parents prefer new process	
Morale	Fall 1992 morale survey _____	Fall 1993 morale survey _____			
Pull Out Scheduling	TBA	TBA	TBA	TBA	
Schedule w/ Whole Lang	TBA	TBA	TBA	TBA	
Student Emergencies	Some parents concerned 1991-92 handling of injuries	No parent complaints 1992-93 on handling of injuries	Preset process & use individual signout records	Exceeded desired state: no complaints + compliments received	
Tenure Guidelines	TBA	TBA	TBA	TBA	
Transportation Parent Sat	34% elem. parents dissatisfied with transpo fall 199	U-10% parents will be dissatsfied with transpo	Revise, post, enforce rules; reduce overcrowding	Good progress: by fall 1992, 26% dissat., by fall 1993, 11% dissat	
Fieldtrip procedures	119 changes made in fieldtrip schedules 1992-93	Only changes for external causes will be made	Dates for 2nd semester trips due Jan., not Oct.	TBA	

High school English and foreign language teachers identified poor student vocabulary retention as the problem they wanted to address. On criterion referenced tests, students retained an average of only 53% of vocabulary teachers had taught to date. Instead of relying on strictly traditional methods. teachers experimented with some non-traditional approaches for 4-8 weeks. Following the treatment, teachers measured with the same criterion referenced tests and found that students increased their vocabulary retention rates by anywhere from 25-60%.

The high school mathematics quality team was handed a problem by a school-wide interdisciplinary team. The problem: current math department course offerings do not meet the needs of non-college bound students. The team came up with a solution to implement on an experimental basis the following school year. Basic level 8th grade math students will be assigned by the computer to one of two sections: one a traditional basic math section, the other a section to be team taught by a math teacher and a vocational teacher. The experimental course will focus on students learning math applications and problem-solving strategies similar to the ones learned by staff in the TQM training. Pre and post testing will be conducted to see if there are any differences for the experimental and control groups. A byproduct of the math quality team's work was that they designed another course for college bound students: Problem-solving and Probability / Statistics.

Have support services improved as a result of quality team work? In addition to the voluntary quality team on transportation parent satisfaction that reduced dissatisfaction with transportation services from 34% in 1991 to 11% in 1993, six required transportation teams, two required office teams, two required cafeteria services teams, and two required maintenance / custodial teams worked to solve problems or improve processes in their areas (see table 12).

The transportation medical emergencies quality team found that there were few procedures in place for bus drivers to follow, so members designed set procedures for all drivers to follow in emergencies. For example, instead of depending on the dispatcher to decide whether a driver needs an ambulance, all bus drivers have guidelines to follow in making that decision themselves. Drivers will also provide standardized emergency information forms for parents to fill out for the driver to keep on the bus.

The high school cafeteria quality team decided to try to increase its student participation rate from 45% to 50% over a two month period. By surveying students, the cafeteria staff found that lukewarm food and serving lines running out of key items were the key causes of low participation. By procuring two extra heat lamps and checking food quantities before the second shift, the team exceeded its desired state by increasing the participaton rate to 55% in a short time. The increase in participation brought a commensurate increase in cafeteria revenues.

An office customer services quality team found that over 50% of telephone messages left for administrative staff were not being seen within 30 minutes of administrators' return to the office, resulting in detectable impatience on the part of some callers. Key causes identified by the team were a) too many different methods of leaving messages was causing some to get lost, b) administrators were not looking for the messages. The solution selected by the team: install message holders on administrators' office doors at eye level. This standard process met the desired state: that all messages be seen within 30 minutes of administrators' return to the office.

High school discipline was identified as a problem area by 26% of parents responding to a 1991 customer survey. A cross-functional team of teachers,

administrators, and parents was formed. It was determined that perceived unfairness was the key cause of the dissatisfaction. The team got the support of the administration and the school board to implement a six step process with preset, stiffer penalties. The administration reports that after a year of implementation, numbers of referrals have been about the same, but that serious problems decreased significantly. Parent dissatisfaction with handling of discipline dropped from 26% in 1991 to 13% in 1992.

Required and voluntary quality teams have not produced sweeping changes and improvements in the Rappahannock County Schools, with the exception that prior to the 1992 - 93 school year never before had every employee of the school system been expected to work cooperatively to improve the system. A huge majority of quality teams have been successful in making good progress towards improvement.

A few teams have not made good progress towards reaching their "desired states," or have given incomplete efforts. Available evidence suggests this may have happened either because a few team members were resistant to being required to use TQM strategies, or because of time constraints. Teachers, secretaries, and bus drivers in most school districts simply can't schedule regular one to two hour weekly meetings during normal working hours.

Marketshare

Is there evidence that the market-share of customers served by the Rappahannock County Schools has increased since the inception of quality management in 1990? Table 13 shows a comparison of September 30 enrollment figures with the school census figures 1989 - 1993. The census figures include all persons ages 5 - 19 residing in the district plus any students ages 3, 4, 20, and 21

known to be identified as being eligible for special education services.The enrollment figure divided by the census figure multiplied by 100 equals the marketshare percentage.

The marketshare figures for the district show a general upward trend from the year before TQM began through the beginning of the third full year of quality implementation. The gains are not substantial, and comparison data for other districts are not readily available.The Rappahannock district is surveying non-enrollees to find out what it might take to attract private schoolers, home schoolers, and dropouts to re-enroll in the public schools.

TABLE 13. Market-share increases after inception of TQM in 1990

Rappahannock County Schools' Market-Share Data

Year	Census Figure	September 30 Enrollment	Market-Share %
1989-90	1,266	920	73%
1990-91	1,266	939	74%
1991-92	1,266	990	78%
1992-93	1,315	1,027	78%
1993-94	1,315	990	75%

Positive outcomes of TQM

Have there been positive outcomes from the implementation of TQM in the Rappahannock County Schools? Associates responding to the study replied "yes" 75%, including 89% of certificated, 100% of administrative and school board associates, and classified 39%. What's the explanation for the low rating by classified, and what accounts for 47% of classified associates not responding to this item? Do classified associates disagree that there have been positive outcomes, or did the 34 % of untrained classified associates tune out items they felt should be left blank if they had not received the training?

Eighty-two percent of self described volunteers-for-TQM training reported that they had seen positives from implementation of TQM, 71% of those who felt that they had been required to undergo TQM training agreed they'd seen positive outcomes, and 44% of the few untrained associates reported seeing positives (44% no response.) It is likely that the untrained may have felt that this item did not apply to them.

Cited as examples of positive outcomes from implementation of quality management: 34% of those giving examples cited success of particular quality teams, 23% cited a greater willingness by associates to compromise and work as members of a team, 19% feel quality management gives educators a system for improvement, 16% a greater awareness of concerns, 13% that TQM makes faculty meetings more focused and productive, and 8% that the whole organization is working in concert to improve. Following are a few more participant comments that relate to positive outcomes.

Associates list positive outcomes:

•There's more openness in faculty meetings.

•Gives others a chance to see problems administration has to deal with.

•We have better tools to problem-solve.

•Quality problem-solving dove-tails with cooperative learning.

•Faculty resolve conflicts without feeling hurt.

•Students and teachers are making a better effort to improve.

•We're conscious of need to hold ourselves to a higher standard.

•There's more cooperative teaching at the high school & more facilitation from the administration.

•Child study teams have been using quality tools to help them find ways to help the child improve.

•More information is shared between the sending and receiving teacher.

•A change is being contemplated in the special education IEP development process due to the emphasis on teachers as internal customers: not only will the child's present teacher be involved, but it is hoped that the child's receiving teacher can also be included in the meeting.

•Through working on teams, teachers, instead of being so isolated, now are working more together to improve things through sharing ideas, etc.

Students list positive outcomes:

•Quality team improved bus behavior and shorter bus rides.

•The quality of education and the way teachers teach.

•The classes are getting harder and the school is getting more organized.

•The new high school discipline policy (from quality team work) has caused behavior to improve and there seems to be less people skipping school daily.

•Behavior in our high school has improved a great deal.

•There are less problems going in school.

•Consistency in disciplinary events.

•The improved tardy process.

•The quality of the teachers.

•The teaching staff is much more able-bodied and well trained.

•The school system itself has improved.

Parents list positive outcomes of quality:

•The Rappahannock School system is at least trying to improve. Others don't seem committed to improvement.

•Our district is showing a desire to continually improve to make the system better.

•We as parents are more and more allowed to be a part of our children's education.

•Transportation has improved greatly because of the parent satisfaction team's work.

•There is an obvious emphasis on problem solving.

•Teachers getting more training in quality and masters program - is improving things.

•Cafeteria more reponsive to parents ideas by implementing some of these ideas.

•Adjustments were made in bus routes to eliminate overcrowding.

Are there other positive outcomes that can be attributed to the Implementation of quality management in the Rappahannock County Schools? Table 14 summarizes the positives from three years of TQM in this public district.

Table 14.Positive Outcomes of Implementation of TQM in the Rappahannock County Schools 1990-1993

•100% of associates are involved in the process of school system improvement.

•Over 70% of associates report that administrators and coworkers have increased their efforts to meet their needs.

•Two-thirds of associates report having an increased role in improving things in the district. This can be viewed as an increased sense of empowerment.

•85% of associates report increasing their efforts to meet the needs of internal and external customers.

•89% of associates report using some aspect of TQM training in their work: teaching students problem-solving, using interactive skills, using tools to continuously improve their work, etc.

•79% of responding parents report the school district has increased efforts during the last two years to meet their children's needs.

•78% of students surveyed have positive student customer satisfaction scores.

•There is a growing list of things that associates, parents, and students say still need to be improved. These are viewed as opportunities for future improvement.

Researcher's reflections

It is not happenstance that the researcher in this study is also one of the associates of the Rappahannock County Public Schools. The assistant superintendent, not unlike many of the district's associates, has embraced the roles of supplier and internal customer of this uneducation-like paradigm. He tries to supply his internal customers: principals with the best employee applicants available, drivers and mechanics with a positive working environment and with substitutes when they need them, teachers with information and advice about the recertification system, school board members with updates about school district happenings or advice passed on by the board attorney, and the superintendent with a supportive yet candid sounding board plus a host of requested reports.

His assignment as superintendent's helper enables observations of some of the inner workings of the implementation of this process for systemic change called TQM. He stood on the raised walkway with the superintendent after the first day of TQM training at the Xerox International Training Center at Leesburg, Virginia. "This is the only thing I've ever witnessed that has promise for revolutionizing education so that it truly meets the students' needs," said the superintendent with the reputation for incredibly high expectations for teachers and staff. "Up to now, we didn't have the slightest idea how to improve education. All we knew to do was provide more inservice for teachers and tell them to work harder to get their students' test scores up. With quality, now we have a process to use for improving education."

So excited were the TQM converts about this new paradigm of serving the schools' customers and continuously improving the organization that it was 36 degrees and 2:15 A.M. before they remembered the 8 o'clock sharp start time for

the next day's training with the 16 young BS's in Business Administration in Xerox training room 3305.

The superintendent began to doubt his own prophesy two years later in the fall of 1992. Associate morale surveys and reports from building administration indicated some staff were unhappy at being required to serve on quality problem solving teams and /or at being assigned specific academic problems to solve. "Bob, maybe this isn't going to work. I thought everyone would buy in to improving education." His assistant responded: "Maybe the problem isn't so much that they don't want to use TQM to improve, but they really are upset with being required to be on teams. Also, could it be that some of these teams are spinning wheels because they've forgotten what they learned in training? Why don't we provide some technical assistance for these teams." He wondered to himself if he'd get anything but negative data on TQM in education when the staff filled out the study surveys at the end of the school year.

A facilitator was assigned to meet with each of the 33 quality teams. Many were behind schedule because of difficulty in scheduling team meetings around teaching and other work activities. Others needed a jump start because they were having difficulty deciding on a problem statement. Most problem statements didn't have congruence between the way the problem was stated in the "As-Is" and the "Desired State." Others had solutions listed in the "Desired State." Once these problems were ironed out, most teams became functional as described elsewhere in this chapter.

During the summer of 1993, the superintendent and his assistant took a half day boat ride and fishing trip to do some preliminary planning for the quality "launch" scheduled for October 29. As the two cruised, fished, and swam, they

talked quality and wondered what directions TQM should take as they entered the fourth year of implementation. "Should we require quality team participation even though 15% of associates responding to this study felt that volunteering to serve on quality teams was more desireable?" "Yes," they agreed. Some of the people who appeared to be key participants on the 1992-93 required teams, they reasoned, were perhaps the very ones who wouldn't have participated given the choice. What would happen this year if we said: "You are responsible for the quality of your work and of the school system, but you don't have to serve on a quality team if you don't want."

What about assignment of team problems? Some had objected to being assigned problems while others got a choice of problems to solve. The superintendent agreed with his assistant's recommendation that people should not be treated differently on this. Everyone would be asked to solve the problem identified by parents and students alike: the schools' academic program.

What about the feeling expressed by some associates in the study that more emphasis should be placed on doing a better job of meeting the needs of internal customers? The two fishermen decided to have the administrative staff form a quality team to improve services to internal customers. "How can we expect teachers, administrators, and classified staff to do an even better job of meeting the needs of parents and students," said the superintendent, "if we're not doing a better job of trying to meet their needs?"

The October day before the quality launch, the superintendent received petitions from some staff stating that they believed in use of quality to improve the school system, but imploring him to make service on the teams voluntary. The two instructional leaders met at 7:15 the next morning to put the finishing touches on

that day's quality inservice to launch the year's quality initiative. "Bob," the superintendent could barely contain himself. "I've been up half the night thinking about this. We're going to do voluntary-only teams." Reacting to the bombshell, his assistant replied: "Dave, this is a real gamble at the last minute. You know this has about a 50-50 chance of working. Why don't we stick with this year's plan and revert to voluntary teams next year like we discussed?"

After the superintendent made his announcement at the division-wide inservice, a teacher got up and said: "We want you to know that we really appreciate you trusting us. We're solidly behind you on improving our school system using quality." Another confided to the assistant afterwards: "The response of the staff that I've heard is great. What I'm hearing is that people feel an internal responsibility to get behind the superintendent on this and volunteer for the teams."

Maybe quality works. Time will tell.

Conclusions

The above data and anecdotes from 795 study participants give strong credence to the conclusion that TQM training and implementation in the Rappahannock County Schools have had a dramatic impact on the way associates do their jobs and work with people. Rappahannock has always had good people who came to work with the intent of doing a good job. Certificated, administrative, and classified employees came to work each day to do their individual tasks: perhaps teaching math to students, listing the school rules for that year in the student handbook, driving 50 kids to school, or serving the school lunch.

With the advent of TQM in the district in fall 1990, and especially with the more complete implementation that evolved between 1991 and 1993, there is a major difference. Teachers are still teaching, administrators are still administrating, and classified associates are still doing their varied tasks. But now most associates are experiencing a sense of connectedness, rather than the relative isolation of their individual roles in the past. Sixty-one percent of associates cited the success of the qualty team on which they served as being the reason they felt more empowered. There is the growing feeling of being part of a team, whether on the "school district's team" and / or on the grade level, school level, or departmental team.

One associate's contribution to that team's work is important, and would be missed. But, there is less isolation of work tasks. For example, certainly individual teachers still teach math to students, but they work as a team to determine if there are improved processes that can be followed to help eliminate the need for students to receive remedial math instruction. Administrators still set and enforce school rules, but quality teams of administrators, staff, and sometimes students and parents share the decisions on improving those processes. Individual

drivers still operate their buses over certain routes to transport children to school. However, drivers serve on teams to design or improve processes for safer loading / unloading , reacting to medical emergencies, etc. Cafeteria workers still help serve a part of the cafeteria line, but they also serve on quality teams with supervisors and / or teachers and principals to improve efficiency of service or the items being served. Secretaries still answer the phone, meet the public, and keep the books. But now secretaries play a vital role in helping to improve things like student emergency accountability procedures.

Continuous improvement is becoming a part of what practically every associate works toward accomplishing each day, whether it be through individual analysis of what can be done to improve, or through reaching a consensus on how improvement can be accomplished as part of a quality team effort. One hundred percent of associates served on one or more required or voluntary quality teams between 1991-93. When surveyed as a part of this study, 66% of associates reported striving to individually continuosly improve their own work, to take responsibility for their own quality, in a sense, instead of waiting for someone else to judge their work.

The implementation of TQM in the Rappahannock County, Virginia schools has made a major difference in the way the district's employees do their jobs to serve the needs of its many customers. As with any innovation, the true test of this venture will be how successful the district is over more than just these three years to meet the needs of its customers and and to prepare its students for serving customers in the workplace of tomorrow.

Appendix A

Customer Satisfaction Survey

Please answer the following questions using the scale below. Any comments that you wish to add may be placed at the end of the form.

	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1. The academic program provided by the Rappahannock County Public Schools will prepare my child/children for the world of work in the twenty-first century.	5	4	3	2	1
2. The various programs (i.e. reading, math, science, etc.) of the Rappahannock County Public Schools meet the needs of my children.	5	4	3	2	1
3. There is open communication between our childrens' teachers, administrators and the family.	5	4	3	2	1
4. The cleanliness of the school buildings and grounds is acceptable.	5	4	3	2	1
5. Discipline in the Rappahannock County Public Schools is fair and consistent.	5	4	3	2	1
6. The major emphasis of the Rappahannock County Public Schools is a strong academic education of its students.	5	4	3	2	1
7. Parents and students are dealt with by school personnel in a friendly and respectful manner.	5	4	3	2	1
8. The transportation services that are offered by the Rappahannock County School Board are excellent.	5	4	3	2	1
9. Everything considered, I am satisfied with the Rappahannock County Public Schools.	5	4	3	2	1
10. Extracurricular offerings (athletics, clubs, field trips, etc.) are adequate.	5	4	3	2	1

11.Comments and suggestions:_____

_____

RAPPAHANNOCK COUNTY PUBLIC SCHOOLS						
Quality Implementation Plan	**Persons Responsible**	**Time Frame**	**Question**	**Data Source**	**Group to be surveyed**	**Survey Dates**
Decision to Adopt Quality	Supt. / Assistant Supt.	-Oct. 1990	Was It Accomplished ?	Original data: Unrecorded conversation	NA	NA
•Join Virginia DOE Quality Partnership	Supt. /School Bd.	-June 1991	Was It Accomplished ?	Original data: Acceptance letter & Board minutes	NA	NA
Governance of Quality Project						
•Steering Committee Composed of 3 teachers,						
Ass't Prin., & Supt. formed	Supt.	-July 1991	Was It Accomplished ?	Original data: Memos and Implementation Plan	NA	NA
•Mission Statement formulated:"Committed to						
Continuous Improvement for each student,						
associate, the system, and Society"	Steering Committee	-August 1991	Was It Accomplished ?	Original data: Board minutes	NA	NA
•Adopt Continuous Improvement Policy	School Bd.	-March 1992	Was It Accomplished ?	Original data: Board minutes	NA	NA
Training Schedule						
•Administrators, Key teachers		-June, 1991	Was It Accomplished ?	Frequency counts: Training log	NA	NA
•Volunteers (Certificated & Classified)		Aug '91-June '92	Was It Accomplished ?	Frequency counts: Training log	NA	NA
•Non-volunteers & New hires		-Aug. 1992	Was It Accomplished ?	Frequency counts: Training log	NA	NA
Training Components:			Was It Accomplished ?	Unrecorded conversations/observations	Trainers	/Aug. 92
•What is Quality?	Trainers	2 hours				
Discuss History of Quality & Define						
•Serving the customer	Trainers	2 hours				
Video on Customer Service						
Define /discuss internal/external customers						
Discuss/define who are schools' customers?						
•Interactive Skills	Trainers	2 hours				
Define: Initiating, Reacting, Clarifying						
Do role playing simulations using skills						
•Problem Solving Process	Trainers	12 hours				
1) Intro 6 steps: ID prob,analyze,generate solutions,						
select/plan sols, implement sols, evaluate						
2) Divide trainees into 3 subgroups & do 2 Problem						
Solving simulations						
•Quality Improvement Process	Trainers	8 hours				
1) Intro steps: ID "Output" & customer,						
ID Customer Requirements &Specifications,						
ID steps in work process, Select measurements,						
Determine if work process will work, Evaluate						
results, & Recycle.						
2)Break group into 3 manufacturing departments						
for "geezenstack" production simulation						
•Control Charts/Continuous Improvement	Supt.	2 hours				
•Variation	Supt.	2 hours				

Gantt Chart

Appendix B

Quality Implementation Plan	Persons Responsible	Time Frame	Question	Data Sources	Group to be surveyed	Survey Dates
Using Quality			Has quality changed the way associates	Open-ended surveys	All associates	/May 93
			do their jobs?			
•Survey customers (parents) on Fee Day	Steering Committee	Each August	Was It Accomplished ?	Frequency count: Survey and reports of responses	Surveys administered by school district	Aug. 91 & 92 & 93
•Associates serve voluntarily on Ad Hoc Problem-						
Solving/Quality Improvement Project Teams	Steering Committee	Sept. '91- May '93	1) Are those who volunteered for training	Frequency count:rosters of volunteer project teams	NA	
			more likely than those who didn't to			
			volunteer to serve on problem solving teams?			
			2) Is there any evidence that services or	Original data: Reports of project teams	NA	
			processes have been improved?			
•Trained Associates start "serving customers"	Each associate	Sept. '91-May '93	1) Do associates feel they are being treated	Open-ended surveys (Appendix C)	All associates	/May 93
			like internal customers by colleagues and by			
			administrators?			
			2) Is there any difference between those who	Open-ended surveys (Appendix C)	All associates	/May 93
			volunteered for training and those who didn't			
			in their willingness to serve other associates			
			as internal customers?			
			3) Is there any change in employee morale?	State DOE & IBM-adapted employee climate surveys	Surveys administered by DOE & District	DOE 9/91 & 4/93
						Dist. 11/92 & 4/93
			4) Do students feel they are being treated	Frequency count: Likert style survey (Appendix D)	All students grades 3-12	/May 93
			as customers? Are they being taught about			
			quality informally? Do students feel any			
			responsibility to do quality work?			
			5) Do parents feel they are being treated	Open-ended surveys (Appendix E)	All parents	/May 93
			like customers?			
•All will serve on standing Quality Project teams	Steering Committee	Sept. '92-May '93	1) Has quality changed the way associates	Open-ended surveys (Appendix C)	All associates	/May 93
Each academic dept, each grade level			do their jobs?			
will have standing team that will use quality			2) Is there any evidence that instructional	Reports to School Board	NA	
to improve instructional services or processes			services/processes have been improved?			

Appendix C

RAPPAHANNOCK COUNTY SCHOOLS			PSP GROUP NAME:		
QUALITY PROBLEM SOLVING GROUP					
OPTIONAL CHECK SHEET					
PROBLEM SOLVING PROCESS	MEETING	ROTATING	GROUP		
SIX STEPS	DATES	ROLES	MEMBER'S NAME		
1.) I.D./Select Problem		Leader:			
Brainstorm list of potential problem areas.		Scribe:			
Clarify any items on list		Timekeeper:			
If over 10 items, bracket items group decides		Process Guide:			
to possibly remove from consideration		Presenter:			
Unbracket any item group reconsiders					
Use numbers to combine similar items					
Use "filters" to reduce list (IE- CAN THIS					
GROUP SOLVE THIS PROBLEM?)					
Use criteria rating sheets/consensus to					
to select problem (Red PSP P. 64-5)					
Print "AS IS" statement in measurable terms:					
Print "Desired State" in measurable terms:					
2.) Analyze Problem		Leader:			
Find Data on Problem		Scribe:			
Brainstorm possible key causes		Timekeeper:			
Use Fisbone (Red PSP Book P. 78-9) to		Process Guide:			
help solidify causes		Presenter:			
Get more data to help "prove" causes					
Display Data on Pareto Chart (P. 84-5)					
Use consensus to identify key causes					
Print Key Causes (Not Solutions):					
3.) Generate Solutions		Leader:			
Brainstorm potential solutions		Scribe:			
Do any ideas need clarification?		Timekeeper:			
Brainstorm pros & cons for each idea.		Process Guide:			
		Presenter:			
4.) Select / Plan Solutions		Presenter:			
Bracket any idea the group wants to		Scribe:			
possibly remove from consideration		Timekeeper:			
Unbracket any item group reconsiders		Process Guide:			
Use numbers to combine similar items		Presenter:			
Use "filters" to reduce list (eg- does this					
address key causes? Is it do-able?					
Use criteria rating sheets/consensus to					
to select solution (Red PSP P. 69-71)					
Print Solution(s):					
			Gantt Chart for Implementation of Solution(s)		
Divide solution into sequential steps/tasks			Tasks in sequential order	Completion by	Person Responsible
and list on Gantt Chart (Red Book P. 96-7)					
List on chart group members to handle tasks					
List on chart range of dates for completion					
Print Implementation Info on Gantt Chart:					
5.) Implement Solution					
Follow the Gantt to get the commitment					
of others (as necessary) to implement					
Make diagram or outline of revised process.					
Implement solution(s)					
Various members of the team split up the responsibilities.					
6.) Evaluate Solution		Leader:			
Use another Gantt Chart to decide on		Scribe:			
how/when/who will measure whether the		Timekeeper:			
solution has helped		Process Guide			
Make measurements & decide whether or not		Presenter:			
solution helped you reach the "desired state."					
If it didn't, is progress towards reaching the					
"desired state" being made?					
If not, go back to step 3 of the PSP?					
Print Outcome of Eval:					

Appendix D

Survey - Faculty and Staff

Directions: This survey was prepared by Bob Chappell for a doctoral dissertation on "the effects of implementation of 'quality management' on the Rappahannock County Schools." Please answer the open ended questions below in as much detail as you wish and return this to the box on the table marked "surveys only".

I. Questions:

1. Since Quality Management was implemented, have the superintendent and assistant superintendent increased their efforts to meet your customer needs?_____

Please explain/give examples_____

_____

2. Have your immediate supervisor(s) / instructional leader(s) increased their efforts to meet your needs?_____

Please explain/give examples_____

_____

3. Have your colleagues / coworkers increased their efforts to meet your needs?_____

Please explain/give examples_____

_____

4. Have you increased your efforts to meet your colleagues' / coworkers'/ supervisors' needs?_____

Please explain/give examples_____

_____

5. Have you increased your efforts to meet the customer needs of parents and students?__

Please explain/give examples_____

_____

6. If you received quality training, has the way you relate / work with other people changed as a result of the training ? _____

If so, how_____

_____

7. Since Quality Management was implemented, have you had an increased role in improving things in theRappahannock County Public Schools?_____

Please explain/give examples_____

_____

8. If you received quality training, in what ways have you voluntarily used things learned in quality training in your work ?

____Using problem solving process to solve problems without forming a quality team

____Teaching students the problem solving process

____Using interactive skills

____Making a conscious effort to continuously improve processes you use in your work.

Other_____

_____

9. What positive outcomes have you seen from the implementation of quality?

_____

_____

10. What would you improve about the implementation of quality?

_____

_____

11. If there were one thing we could use quality to improve about the Rappahannock County Schools, what would it be?

_____

_____

II. Demographics:

- My job with the Rappahannock Schools is :

_____ Aide, bookkeeper, bus driver, cafeteria, computer curriculum writer, custodian, mechanic, secretary

_____ Counselor / librarian / social worker / teacher

_____ Instructional leader / school board member

- I volunteered for quality training: _____ yes _____ no _____have not receivedtraining

Survey - Students of the Rappahannock County Schools E

Directions: This survey was prepared by Assistant Superintendent Robert Chappell for a doctoral study on the "effects of implementation of 'quality' on the Rappahannock County School System." Please answer each question below by circling the appropriate number below the question.

I am a student at ____RCES ____RCHS

1. I am aware that the Rappahannock Schools have been using "quality management " as a way of trying to improve the school system.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

2. My teacher (s) have taught me how to use the "quality" Problem Solving Process (even though they were not asked to do so).

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

3. I work hard in my classes and feel that students have a responsibility to do quality work.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

4. I do my homework assignments to the best of my ability and turn them in on time.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

5. I try hard to give correct answers on the Iowa Tests (ITBS or TAP).

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

6. I treat all school employees with courtesy and fairness.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

7. The superintendent and assistant superintendent treat me with courtesy and fairness.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

8. The principal and assistant principal treat me with courtesy and fairness.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

9. The teachers and teacher aides treat me with courtesy and fairness.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

10. The secretaries, custodians, and cafeteria staff treat me with courtesy and fairness.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

11. The bus driver treats me with courtesy and fairness.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

12. I feel that school employees treat boys and girls the same.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

13. My classes are interesting.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

14. I feel that I am being prepared for work that I will be doing at higher grade levels.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

15. I feel that teachers are willing to give me extra help when I need it.

5	4	3	2	1
Strongly Agree	Agree	unsure	Disagree	Strongly Disagree

16. Next to the subjects you take, please circle the number of the statement that indicates how well that subject meets your needs:

English/ Lang. Arts	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy
Reading	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy
Mathematics	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy
Science	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy
Social Studies	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy
Foreign Language	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy
Fine Arts: Drama Music/Art/	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy
PE/Health	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy
Vocational Education: Business/ Home Ec/ Technology Ed	5 Too Difficult	4 Difficult	3 About Right	2 Easy	1 Too Easy

17. In the last two years I've been a student in the Rappahannock County Schools, the things that have improved the most are:

_____

_____

18. If I could improve one thing about the Rappahannock County Schools, it would be:

_____

_____

Survey - Parents of Students in the Rappahannock County Schools F

Directions: This survey was prepared by Assistant Superintendent Robert Chappell for a doctoral dissertation on the "Effects of implementation of 'quality management' on the Rappahannock County School System." Please answer each question below and return it in the envelope provided this week.

I/We have children at: ____RCES ____RCHS ____Both schools

1. Are you aware that the Rappahannock County Schools have been using "quality management" as a way of trying to improve the school system?_____

2. In the last couple of years, have you been asked to fill out surveys related to school system improvement?_____

3. In the last couple of years have you noticed increased efforts by employees to try to make improvements in the school system?_____

4. In your dealings with the superintendent and assistant superintendent, do they treat you with courtesy?

_____

5. In your dealings with the principals and assistant principals, do they treat you with courtesy?

_____

6. In your dealings with your son's / daughter's teachers, do they treat you with courtesy?

_____

7. Does your child's bus driver treat you with courtesy?

_____

8. Have the schools increased their efforts to try to meet your child's needs ?

_____

9. How have the educational services of the Rappahannock County Schools improved over the last couple of years?

_____

_____

10. How have the support services (cafeteria, transportation, custodial, etc.) improved over the last couple of years?

_____

_____

11. If you make requests of school employees, do you receive prompt replies?_____

_____

12. Do you feel that the classes your child is taking this year will help prepare him/her for next year's work ?

_____

13. Have you had an increased role in improving things in this school system since 1990-91 (in other words, have you served on quality improvement teams or had more input in some other way?) :

_____

_____

14. In the last two years, the thing that has improved the most in the Rappahannock County Schools is:

_____

15. If you were able to improve one thing about the Rappahannock County Schools, it would be:

_____

_____

16. Check any of the things you do from the list below to help the school produce a quality education for your children?

____Read to or listen to my child read
____Expect child to study each evening
____Help tutor my child
____Member of PTO or Booster group
____Volunteer to help at school
____Other:_____

17. How do the Rappahannock County Public Schools stack up against the other schools with which you are familiar ?

_____

_____

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Vita

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EDUCATION

1993 December Doctoral candidate. Virginia Tech University. Major - Educational Administration. Dissertation: "Effects of Implementation of Quality Management in the Rappahannock County, Virginia Public Schools."

1972 Completed M.Ed. at U. Va. Major: Guidance & Counselling
1966 Completed B.A. at U.N.C.- Chapel Hill. Major: Political Science

RELATED EXPERIENCE

1993 Presenting paper in Dallas November 5th on TQM in Education at National convention of American Evaluation Association. Consultant to two school districts and an educational task force on quality. Article on TQM in Education accepted for publication in Quality Progress magazine.

1992 Presented paper at International Conference on Standards and Quality in Education at the University of Oklahoma.

1991 Completed "Train the Trainer" course in Quality Management at the Xerox Corporation.

1990 Completed Quality Management training at the Xerox Corporation

PROFESSIONAL EXPERIENCE

1987-present
Assistant Superintendent/Quality Coordinator of Rappahannock Co. Schools in Sperryville, Virginia.

1982 to 1987
Principal of Rappahannock Co. High School.

1978 to 1982
Assistant High School Principal in Madison Co. , Virginia.

1972 to 1978
Guidance Director at Jack Jouett Middle School in Albemarle Co., Virginia.

1966 to 1971
Teacher of mentally disabled students age 13-19 at Orange Co. Intermediate School, Virginia. Also seventh grade & US Government teacher in Buckingham County, Virginia.

Robert T. Chappell
Signature

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