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A Study of the Effects of an Industrially Used Training Program for Quality on an Educational Setting

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A STUDY OF THE EFFECTS OF AN INDUSTRIALLY USED TRAINING PROGRAM FOR QUALITY ON AN EDUCATIONAL SETTING

by

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VITA

The author, Lucille Anne Phillip, is the daughter of Theodore Phillip and Stella Phillip. She was born February 17, 1948, in Chicago, Illinois.

Her elementary and secondary education was obtained in the public schools of Chicago, Illinois. She graduated from Taft High School in 1965. In September, 1965, she entered University of Illinois in Chicago, receiving the degree of Bachelor of Science in mathematics in May, 1969.

From 1969 through 1978 she was employed as a teacher in the mathematics and data processing department at Amundsen High School in Chicago. During that time she earned a Master of Science degree in mathematics from Northeastern Illinois University and a Specialists degree in education from Eastern Illinois University.

In 1979 and 1980, she worked in the data processing department of Sentry Insurance. She then returned to education in 1981 when she began teaching at Fox Valley Technical College in Appleton, Wisconsin. She was granted a sabbatical leave during the 1986-87 school year. During that time she attended Loyola University to work on a degree of Doctor of Philosophy in Education Leadership and Policy Studies.

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CHAPTER I

INTRODUCTION

Background and Nature of the Study

Many books and articles have been written about what must be done to put quality back into industry in the United States. Comparisons between American businesses and Japanese businesses are often made in these publications. Some problems have been identified and solutions have been proposed. The concepts presented in these works have several factors in common. One, is an indication of the seriousness of the competition that United States' business and industry faces. Another is that there must be a strong commitment to improving quality throughout each company and this commitment must begin now.

Businesses are particularly concerned with the costs involved when there is a lack of quality in their product or service. These costs consist of the price of doing things over, added supervision, and loss of customers (Crosby, 1979). Some of the benefits of a commitment to quality are lower costs, better competitive position and happier employees (Deming, 1982). American industry needs to concentrate

on providing quality services and products in order to remain competitive in the world market (Naisbitt & Aburdene, 1985).

Education meanwhile, has been facing its own crisis. Naisbitt described it in 1982 in Megatrends. Schools, he pointed out, are presenting an increasingly inferior product. There is no shortage of literature on the state of affairs in education. Similarly, there is also no shortage of reports suggesting solutions to the trouble in which education finds itself. The failure of many of our school systems has been felt, creating an intense interest in improving the quality of American education. The Carnegie Report indicates that "The 1980s will be remembered for two developments: the beginning of a sweeping reassessment of the basis of the nation's economic strength and an outpouring of concern for the quality of American education" (Task Force on Teaching as a Profession, 1986 p. 11).

The concern about quality therefore, can be seen in these two separate arenas. First, the business community which is working toward a commitment to quality by following models provided by corporate consultants and second, the educational community which is working toward a commitment to quality by following prescriptions by educational leaders and task forces. Little has been done to combine the two forces, yet many of the same qualities of excellence found in

companies are applicable to educational institutions (Roueche & Baker April, 1985). Besides a common search for quality, there is also a significant link between education and the economy (AAJC Commission on the Future of the Community Colleges, 1988). Therefore, perhaps the education and business communities would find added benefits by sharing ideas and resources in a common commitment to excellence.

"Low quality at any stage in the educational process will debilitate education at all levels" (Task Force on College Quality, 1986). This study looks at a college level environment with hopes that if higher standards of excellence are achieved at that level, they will eventually be reflected at all levels of education. Particularly, in this study the staff of a technical college participated in a training program designed for corporate use, in an attempt to combine efforts made by both the business and education communities to achieve excellence.

Statement of the Problem

A group of instructors from various departments at Fox Valley Technical College (FVTC) were trained in the quality process designed by Philip Crosby of the consulting firm, Philip Crosby Associates, Inc. This team of instructors designed the curriculum for a 20 hour training class on quality concepts which would be presented to the faculty of

FVTC (see Appendix C). The class contained the quality first concepts advocated by Crosby and the quality first concepts as applied to education (Spanbauer, 1987).

The problem was to determine whether the faculty would take Crosby's concepts of quality as presented in the training classes and apply them in their own classroom situations making them more effective teachers. This problem was translated into five hypotheses.

Hypotheses

The following hypotheses were tested in this study:

1. The training program had no effect on the quality of instruction by the faculty.
2. There was no difference across divisions in the quality of instruction by faculty after taking the training program.
3. There was no difference in the quality of instruction by male instructors who took the training program compared with female instructors who took the training program.
4. There was no difference in the quality of instruction among the groups of; those taking the pre-test and training, those taking the pre-test but not the training, and those not taking the pre-test but taking the training.
5. There was no difference in the quality of instruction by those completing the training ten months previous to taking the post-test, compared with those completing the training

eight months previous to taking the post-test, compared with those completing the training five months previous to taking the post-test, compared with those completing the training one month previous to taking the post-test.

Definition of terms

The following terms and acronyms are relevant to this study:

1. DACUM. Designing a Curriculum. This is a system used to determine the major tasks and competencies which should be included in instruction of a course. Performance objectives and tests are then developed based on the identified tasks and competencies.

2. Department. This represents the staff, students and curriculum in a common instructional area at FVTC such as the data processing department or the accounting department. This is a subset of a division.

3. Division. This represents a group of departments with a common orientation. The data processing, accounting, banking and finance, marketing and fashion merchandising departments for example, make up the Business Education Division at FVTC.

4. FVTC. Fox Valley Technical College. This two-year technical college is located in Appleton, Wisconsin.

5. Standards for Excellence. This is a set of

standards developed to "provide a means for assessing the quality of ...instruction."(Staff of Standards Project, 1985, p. i) It is used in this study as an instrument to measure any change in quality of instruction.

6. QIE. Quality Instructor Education. This is a 20-hour course which includes those concepts about quality advocated by Crosby. It also includes the application of those concepts to the field of education.

7. Quality. Using Crosby's definition, "Quality is conformance to requirements."(Crosby, 1979 p. 15). An improvement of quality in this study, would be shown by an increase in the Standards of Excellence being met by the faculty.

8. WisCom. Wisconsin Competency-Based Occupational Curriculum Data System. This is a system to include all aspects of curriculum on a computer file. This system facilitates the sharing of curriculum and the updating of it.

Population of the Study

Fox Valley Technical College is a two-year vocational-technical school in northeast Wisconsin. It serves a five-county area working with approximately 45,000 part-time, full-time and occasional students. There are 62 programs of study. Students may earn two-year associate degrees or one-year vocational diploma (Spanbauer, 1987).

Faculty members under contract with FVTC on the Appleton and Oshkosh campuses were used as the sample population in this study. Since all members were included, they represent each of the five main divisions at FVTC; Agriculture/Home and Consumer Science, Business Education, Special Services/ General Education, Health and Human Services, and Trades and Industry.

Limitations of the Study

Since only one institution was used as the sample in this study, the ability to generalize the results to other schools is limited. FVTC is a two-year college. It is uncertain how the results may be applied to other types of educational institutions.

Subjects in this study were put into various groups to enable the investigator to compare results based on different conditions. One such condition was amount of time lapsed between taking the QIE training and the post-test. Others were whether or not the pre-test was taken or the QIE class was attended. Since members of each of these groups had interaction with all faculty members and the quality process became well known throughout the college by the end of the school year, it was difficult to maximize the between-groups variance.

The survey used in this study was of a self-report

form. Faculty members were asked to rate whether their departments were meeting standards for excellence. Self-report data are limited to the opinions of the subjects and willingness to answer the questions honestly.

Significance of the Study

This study attempted to bridge the gap between the work done in education and the work done in industry to achieve excellence. If it could be shown that guidelines set up by business consultants could be used to improve the service that education provides, a whole new partnership could be formed between industry and education. Duplication of effort could be avoided by coordinating research and study and by using already developed models for improvement of quality.

The possibility of educators working closer with business and industry is significant. There are common goals between the two groups. If the use of common methods to achieve those goals can be shown to be effective, then other resources might be shared. Businesses may begin to use educators in their training tasks either as consultants or trainers. Educators may look to industry, not only for models to use to strive for excellence, but also for updating their technical skills or providing ideas for significant in-service activities.

Some of this sharing of resources and ideas is already occurring. However, there has been little work done to show that there is a significant connection between the work done in industry and the work done in education. This study hopes to show that the connection does exist and would therefore encourage more cooperative efforts by individuals in both of those areas.

Summary of the Study

The research and literature described in chapter 2 of this study, indicates that there are similarities in how consultants in industry and researchers in education define quality. The industrial consultants recommend various procedures how to create a quality organization. One of these procedures was recommended by Philip Crosby. It was his model that was used in this study by applying it to an educational institution.

The faculty of FVTC filled out a survey instrument as a pre-test before taking part in a quality training program. Throughout the 1987-88 school year, faculty members participated in the quality instructor education (QIE) classes. They then completed the same survey at the end of the school year. Analysis was done comparing the results. The description and analysis of the data is presented in chapters 4 and 5 of this study.

Analysis of the data indicates that the faculty members rated their departments more favorably at the end of the school year after QIE than at the beginning of the school year. However, limited conclusions can be made because improvement was made by members of all treatment groups.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Studies have been done to assess the status of training in both educational and industrial organizations. Suggestions have been made for improving training for educators as well as for employees of business and industry. Educational and industrial organizations have both received suggestions on how to achieve quality. The best of both types of organizations have been studied to enable researchers to assemble lists of characteristics typical of these excellent organizations. The literature has illustrated that the efforts made by both industry and education to improve quality have many similarities.

Industry

Status of Training. Although many models for improving human performance have been implemented in various organizations, there has been little data about the actual state of employee training in America. In 1986, a study was done by Opinion Research Corporation (ORC), sponsored by the American Society for Training and Development (ASTD) to

compile data that would provide a comprehensive perspective on employee training in the United States. Seven hundred fifty-six telephone interviews were completed with training and development executives from a random stratified sample of U.S. companies ("Employee Training in America", 1986).

Most of the people that were interviewed agreed that employee training was an important part of corporate planning ("Employee Training in America," 1986). The importance that companies placed on training and education could be seen in two examples. In 1982 General Motors was spending approximately $6.7 million a month on various types of employee training (Pautler & Schiavire, 1987). In 1986, Motorola invested over $44 million in training and education of its employees (Wagel, 1986). Estimates of the annual costs of training and education by business and industry ranged from $30 to $50 billion (Lloyd, 1987).

The ORC study found that four of five companies had monies set aside each year for training. The trainers were employed in either the personnel/human resources, training, operating, data processing, marketing, or finance departments. It was also learned that half of the corporate trainers did not conduct a needs assessment before developing a training program even though they believed it was important ("Employee Training in America," 1986).

The ORC study also showed that the training programs themselves were usually developed by a combination of in-house staff and outside consultants. Once the programs were developed in-house staff were often used to conduct the actual training. The training objectives were usually performance-related and formal evaluation methods were generally used to measure the success of the implemented training programs ("Employee Training in America," 1986).

Factors for Successful Training. In measuring the quality of a program, often instructors indicated that training had succeeded if the trainees showed that they mastered the material that was presented. However, from the frame of reference of the organization, this was not necessarily the case. A program could still be considered a failure even if the material was learned. The trainees had to be able to apply their new skills on the job and the application of these skills had to improve their performance in a way that benefited the organization significantly before success could be declared (Spitzer, 1986).

The ORC study ("Employee Training in America," 1986) showed that when a training program did fail, the primary reason given for the failure was the lack of on-the-job rewards for behaviors and skills learned in training. The next most common reasons that were given for the failure of a

program were; insufficient time to execute the training programs, the work environment that did not support new behaviors learned in training and the lack of motivation among employees. Other reasons cited for failure were; inaccurate training needs analyses, training needs that changed after the program had been implemented, management that did not support the training program and an insufficient funding of the training program.

Spitzer (1986), president of the High Impact Training consulting firm, also compiled a list of factors seen to cause failure of training programs. This list is similar to the one compiled by ORC, but Spitzer included two additional factors. He found the when too few employees were trained, or the ones who were trained were chosen poorly, untrained employees were likely to reconvert trained employees to former ways of doing things. Also, if there was little or no preparation or follow-up, little would change regardless of the training.

To combat these failure factors, organizations could incorporate five training success factors in any model used for improvement of products or services. The first of these should be value. The trainer should look for the most valuable opportunities to improve performance in the organization. It may not be appropriate to expend a dispropor-

tionate amount of resources to achieve minimal results, or to force a training program on participants or supervisors with strongly negative attitudes. An example of a high-value opportunity would be when there was a large performance gap among employees in the same job, and when closing this gap could mean significant increased revenues or reduced costs for the organization (Spitzer, 1986).

Second, training programs should focus not just on knowledge and skills. The employees' supervisors should be involved, expectations should be clarified, appropriate feedback and positive incentives should be given. The third factor that Spitzer listed involved power. Performance improvement programs must be powerful enough to overcome all the forces in the system that resist change. This could be done by broadening the focus to include the work environment as well as the improvement of knowledge and skills (Spitzer, 1986).

Mass training was another factor for success listed by Spitzer. If only a small percentage of the employees doing a particular job attended training, then the untrained employees would be more likely to convert the trained employees back to the old methods than vice versa. There should be a support system so trained employees could maintain their new knowledge and skills (Spitzer, 1986).

The last factor for success that Spitzer listed was that of duration. He separated this factor into four components. All non-training factors in the system (unclear expectations, poor job design, etc.) should be appropriately modified. Employees should be prepared for training by supervisory contact or preview sessions. The training session should take place with enough time allowed for on-the-job application. The trainer should coordinate follow-up activities that involve trainees' supervisors. All of these factors combined should help to overcome the main causes of failure of training programs (Spitzer, 1986).

Kaufman and Sample (1986), educational research and development specialists offered some suggestions on how training and development professionals could improve the quality of their programs. Precise measurable objectives should be prepared. They indicated that many would-be competency statements were characterized by honorable intentions but they lacked precise measurable criteria. Besides these measurable objectives, Kaufman and Sample (1986), like Spitzer,(1986) stressed the need to get a more holistic focus.

> If we are to share the rewards of "Japanese" and "excellent companies" methods, it will be through adopting a concern for superordinate goals and thus shifting our focus from the individual task or job to the organization and the society as the unit(s) of change. (p. 18)

Kaufman and Sample (1986) found that an essential ingredient of "excellence" was that there were common visions of organizational purpose shared by all in the company. They discovered that successful companies were concerned with defining and achieving "what should be." This holistic frame of reference represented a shift from a concentration on means and efficiency to an additional concern for combining these with measurable competencies which delivered appropriate organizational results and positive external impact. Kaufman and Sample strongly suggested that American training models and approaches require this in order to survive.

Methods to Achieve Quality. One of the training models for excellence that contained many of the desired features outlined above, was developed by Deming (1982). He noted that one of the most important components for success was to maintain a quality philosophy and management. He stated that the benefits of improved quality were lower costs, better competitive position and happier employees. Deming's model outlined a fourteen step procedure to improve quality.

The first of Deming's (1982) steps was to be consistent in the goal of improvement of product and service. Long-term planning, research and education should therefore be incorporated into plans. Second on his list was to adopt

a new philosophy. He pointed out that it was no longer adequate to live with an accepted level of mistakes. Third, Deming's program discouraged dependency on mass inspection. Mass inspection would often be ineffective and costly. That business should not be awarded on price tag alone, was the fourth point. Quality and service must be considered. The fifth point was to continually improve quality. There should always be plans or ideas for improvement of the system of production or service.

Deming's (1982) sixth step was to institute modern methods of training on the job. Step seven was to institute modern methods of supervision. These methods should remove barriers that keep the employees from doing their jobs. Step eight was to develop the means to eliminate fear, which should then help communication. The introduction of procedures to eliminate barriers between staff areas was the ninth step. This would encourage teamwork which would be desirable in a successful organization.

Deming's (1982) tenth point was to eliminate numerical goals for the employees. Numerical goals set by other people would not produce the desired positive effects but could have negative effects instead. Following the elimination of numerical goals set by administrators, was the elimination of work standards and numerical quotas. Deming's

twelfth factor was to remove other barriers that prevented the employees from doing quality jobs. This would take involvement and understanding of management.

The thirteenth point that Deming (1982) made was to institute a vigorous program of education and training. This would situate people into new jobs and different responsibilities. His final point was to maintain a management team that would remain committed every day to the above thirteen steps of this quality process.

Crosby (1979) of Philip B. Crosby Associates, Inc. also developed a model for a program to improve quality. Crosby's fourteen step procedure, like that of Deming, also reflected those success factors listed by Spitzer and Kaufman and Sample. The first of Crosby's steps was to get management commitment. The policies about quality should therefore be developed by the top executives. The second step was to create a quality improvement team. This team should plan and oversee the process of improvement of quality. Each department should be represented on the team.

Once this team was in place, the third and fourth steps could begin. Crosby (1979) defined quality as conformance to requirements. His third step was to initiate quality measurement in order to determine the current and potential nonconformance problems. The cost of quality could

then be determined which should help everyone get a better picture of the whole process. This led to the fifth step which involved providing for continuous quality awareness. This should help keep all personnel aware of and concerned with the quality process. The sixth step was to institute a systematic corrective action system to resolve problems. This should involve a team effort. A "Zero Defects" program should then be planned. This was the seventh step, which would let all personnel know what was expected from them. The goal should be to do the job right the first time.

Providing appropriate training for supervisors was identified as the eighth step. The creation of a "Zero Defects" Day was the ninth step. This event should be designed to make all employees aware that there had been a change in the way things were being done. The tenth step was for employees to establish improvement goals. The eleventh step involved the establishment of an error-cause removal procedure to give employees a method of communicating to management any barriers to getting the job done right the first time. Recognition events to show appreciation to employees was the twelfth step. The creation of quality councils to facilitate the sharing of problems, feelings, and experiences, was the thirteenth step. The last step was to repeat the process. The idea should be that quality improve-

ment never ends and should be a continuous process (Crosby, 1979).

In Quality Without Tears, Crosby (1984) expanded upon his quality process and summarized how to eliminate problems in an organization. Determination, education, and implementation were needed to institute and maintain a system of quality in an organization. Crosby viewed quick-fix approaches, unfair performance reviews, favoritism, and poorly-run meetings as demotivators and things to avoid. He indicated that improvement was based on getting everyone to do the job right the first time. To educate people to his fourteen step process for quality improvement, six factors should be encouraged; comprehension, commitment, competence, communication, connection, and continuance. People should get continual reassurance and recognition for their successes. He suggested that people in service industries as well as manufacturing industries would benefit from following his steps for improvement of quality.

Deming (1982) and Crosby (1984) both suggested that in order to make a lasting change, a change must be made to the entire organization's environment. Their steps to achieve excellence included; improvement in communication, policies, education, teamwork and measurement. Hayes (1985) repeated this importance of a holistic approach to change.

He cited seven steps for improvement of quality. Organizations should, improve communication, train staff, select targets for improvement, set objectives for improvement, assign responsibilities and execute the steps. John Naisbitt and Patricia Aburdene (1985) also agreed with the complete change concept and indicated that the corporation as an analog for the rest of society, was often the most responsive to change.

Naisbitt and Aburdene (1985) believed that the companies that created environments for personal growth would attract the most talented people. The corporate manager's new role would be to cultivate and maintain this new environment. The manager's role would change to teacher, mentor and developer of human potential. They stated that compensation systems should reward performance and innovation, helping to eliminate differences between workers, managers, and owners.

Naisbitt and Aburdene (1985) saw a trend of contracting out for a variety of services. They saw this as an indication of the need for a networking style of management to replace the top-down authoritarian style. Everyone would be a resource for everyone else. Naisbitt and Aburdene agreed with Deming (1982) and Crosby (1984) about the importance of teamwork. These factors of networking and teamwork fit into the holistic approach to improvement of

quality.

The main consideration that Naisbitt and Aburdene (1985) stressed, was that in the changed corporation, quality would be paramount. Value to the individual would mean, quality products, quality service, quality environment, quality employee relations and quality community involvement. They also suggested that intuition would gain new respectability in the corporate world, which has been run by numbers in the past. Large companies would discover that to compete in a changing marketplace, they must adopt many of the values of small business. Society in general would be affected and would focus more on quality of life, including good climate, good schools, cultural opportunities, and recreational opportunities.

Albrecht and Zemke (1985) brought the discussion of quality closer to the educational environment by addressing quality in the service industries. Although all industries could be included by varying degrees, in the category of service industries, schools certainly were service oriented and could therefore be included in the discussion. Albrecht and Zemke stated that schools were as much a primary producer of salable products as were farms and factories. So although the authors discussed quality in industry, they did illustrate the relationship with quality in education.

Albrecht and Zemke (1985) pointed out that as manufactured goods and products became more similar, the quality of the accompanying service would make the critical difference between success and failure. Those who served best, profited most. Organizations must deliver high quality, cost-effective service to be competitive.

The model presented by Albrecht and Zemke (1985) to achieve this high quality summarized many points presented by Deming and Crosby. Albrecht and Zemke's model began with evaluating the current levels of quality of service. It then clarified the service strategy or system. The organization's employees must then be educated. Employees must be shown how this new way of doing things would work. New methods of dealing with customers could then be carried out. Management must not only be committed to the goals but must also reinforce the new processes constantly. This system of quality should become a permanent part of the culture in the organization in order to succeed.

Characteristics of Quality Organizations. The above models gave guidelines for achieving excellence in an organization. Other studies listed the characteristics that made up excellent organizations. Some of the same characteristics appeared repeatedly and also reflected the goals of the above outlined programs. For example, in The 100 Best

Companies to Work for in America (Levering et al, 1984), one could see many recurring characteristics of successful corporations. Quality was stressed, which generated feelings of pride in the products produced or services provided. The commitment of management to the process of improving quality was seen as important. This implied the reduction of the distinctions of rank between the top management and those in entry-level positions. Teamwork was encouraged, as was open communication. Training and education of all employees wa seen as important. Mills (1985) repeated these same characteristics of quality organizations in addition to the presence of a clear mission. He studied 300 companies in examining American industry in The New Competitors.

Peters and Waterman listed eight characteristics of successfully managed companies in In Search of Excellence (1980). They studied a sample of American companies that they considered to be excellent. The first characteristic they found, was an action orientation. New ideas were encouraged, and systems were kept simple so they did not block action. The second characteristic of excellent companies was that they were close to their customers. Service was important and there was a strong sense of accountability.

The third characteristic listed was that there were

many leaders and innovators in these successful companies. The entrepreneurial spirit was encouraged throughout the company and communication was easy. The fourth point was that the rank and file of the company were treated as partners; with respect and dignity. Many of these companies viewed themselves as an extended family. That these companies had some basic values was a fifth characteristic. For example, they had beliefs of being the best, of the importance of superior quality, and of the importance of each individual employee and customer (Peters & Waterman, 1980).

The sixth characteristic was for the company to concentrate on the business it knew rather than trying to diversify into too many different fields. The seventh characteristic was that of keeping things simple. A simple organizational form was used with a small corporate staff. The last characteristic was that of being simultaneously loose and tight. There were strongly shared values and tight control without constraint. The shared values gave the framework which gave people confidence that encouraged them to experiment (Peters & Waterman, 1984).

In A Passion for Excellence (1985), Peters along with co-author Austin again stressed the importance of focusing on customers and encouraging innovation in order to achieve excellence. This is repeated by Hayes in Quality and

Productivity: The New Challenge (1985). There must be a commitment to people and quality in order to be successful.

Summary. There has been no shortage of publications about improving American industry. The challenge from Japan has been heard and has created intense interest in improving the quality of American products and services. In the pursuit of quality, each of the experts cited above, found one common factor - a commitment to people, both inside and outside of the organization.

Business specialists have each listed different steps or programs to follow to improve the organization. They may have used their own terms or slogans, but they were all working toward that same goal of a commitment to quality from the top of the organization on down. Each of them recognized that the commitment to quality should be customer oriented as well as product oriented. The commitment to excellence should be reflected by those people who made the product or service conform to the standards that were used by industry to measure quality.

Education

Status of Training. Nowhere in the field of education is there a greater need for innovation than in teachers' in-service education. (Allen, 1973). Sergiovanni and Starratt agreed that in-service training programs for

teachers had many shortcomings. Many of the programs were too formal and bureaucratic and were seen to be administrative responsibilities (1983). Yet, continuing professional development should be a challenge to be faced by all professionals at all levels. An effective professional growth program was found to be one of the major needs of the educational field that was not met (Knezevich, 1984). More research should be done to improve the professional knowledge base on which the science of teaching rests (Futrell, 1987).

A national study that was conducted to assess the status of staff development practices was conducted by Centra in 1976. Seven hundred fifty-six questionnaires were completed by college administrators and used in the study. Fewer than half the respondents said their institution provided any form of personal development for their faculty members. One of the least expensive practices that was considered effective was the faculty exchanges or visits to other institutions. Different types of staff development programs included sabbaticals and temporary teaching load reduction, assistance programs run by senior teachers and programs involving assessment techniques. More than forty percent of the institutions had a development unit which would coordinate programs for staff development (Centra, 1977).

Knezevich found that university in-service programs tended to be information-oriented. The intent of these programs was that the educators would apply the newly acquired information in their own manner. Local school systems had in-service programs that were performance or competency-oriented. These professional growth programs intended to improve classroom learning outcomes (1984).

Teachers have generally been critical of most in-service training programs. However, the faculty meetings have gotten the most criticism since they have often been called with little planning and with no objectives. These meetings have however, been found to be effective in situations where there were clear purposes and when they were planned to take place just before or after the school year (Knezevich, 1984).

Other teacher development programs that have been offered include; continuing education requirements, teacher academies, and summer institutes. Continuing education requirements involved requiring a certain number of credits from a variety of classes for credential renewal. Other sources for professional growth were teacher centers and computer demonstration centers (Time for Results, 1986). In any of these programs, the activities typically involved the presentation of information (Sergiovanni, 1983).

Factors for Successful Training. Dewey felt that successful teacher training should contain elements that improved the teacher's moral character, improved the teacher's knowledge base and united the two (1959). West agreed that increasing the teacher's knowledge about subject matter alone was not enough to make a training program successful. She suggested that personal and intellectual growth opportunities would both be necessary. Whatever the content of the faculty in-service program, it should have been developed with the assumption that the faculty was the most important resource (Gerth, 1973).

Sergiovanni (1983) listed five components that should be present in any staff development program in order for it to be successful. These components were; intents, substance, competency areas, approach and responsibility. Program intents and substance should be matched with appropriate approaches and levels of competency and responsibility.

If the intent of a program was at the knowledge level, it presented information to the faculty. A program at the comprehension level of intent was designed to help teachers understand some concept. At the applications level, the program showed the instructor how to use a particular method or idea in the classroom. At the value and integration level, the program developed commitment from the faculty

to some concept or method (Sergiovanni, 1983).

Sergiovanni (1983) suggested that the knowledge and comprehension levels were appropriate for staff-development programs. However, these would not be sufficient, if the intent was to produce integration of values. Similarly, a value and integration-level program would be a waste of effort and expense if the goal was to share information only.

The substance of a staff-development program should involve the teacher's basics beliefs and theories, sensitivity to students, teaching techniques, and knowledge of subject matter (Sergiovanni, 1983). Rubin (1975) pointed out that when teachers were knowledgeable, they could go beyond the textbook and the quality of pedagogy became extraordinarily impressive. Sergiovanni (1983) agreed with this observation and stated that the less a teacher knew about the subject matter, the more trivial the teaching became. When a program was developed around teachers' beliefs, sensitivity to students and teaching methods as well as subject-matter knowledge, it provided a comprehensive, worthwhile activity.

The third component of a successful in-service program listed by Sergiovanni (1983), was content. Continuing professional growth in the appropriate competency areas should be an important part of staff training. A quality in-service program should provide means for the self-improve-

ment of instructors.

The fourth component of a successful in-service program that Sergiovanni (1983) pointed out was that of approach. The approach to staff development should be one in which the supervisor entered into an equal relationship with teachers and assumed an active role with them. In this approach, the teachers and supervisor would be actively involved in the activities as colleagues. The last component was that of responsibility. The responsibility for an effective staff- development program should be shared by the supervisor and the teachers. Thelen (1973) however, suggested that teachers were the best judges of what should go in the programs. "One of the few certainties in the field of human endeavor is the relationship between involvement in an enterprise and commitment to its goals" (Harris, 1969, p. 9).

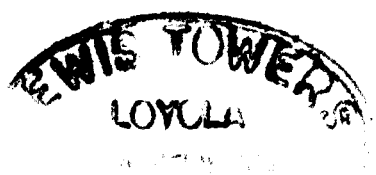
Fischer (1973) listed four operational guidelines for an effective in-service program. He suggested that professional growth activities should go beyond mere mastery of teaching techniques. There should be perennial in-service training of teachers related directly to professional standards that have been based on a body of reliable knowledge. There should be sufficient time allotted to permit individuals to devote some of their time to professional improvement. Time should also be given to enable systematic

field testing of new ideas in education.

A study by the Florida State Department of Education listed characteristics of effective staff-development programs. Programs should have teachers participate as helpers to each other and planners of activities. When teachers took active roles in the programs, objectives were more often met than when the teachers were passive recipients of information. Effective programs individualized their activities to meet different needs. The programs that allowed the teachers to select their own goals and activities were more successful than those with preplanned activities (Lawrence, 1974).

Knezevich (1984) indicated that effective programs had specific goals. These goals met the individual needs of the teachers. It was found that effective schools went one step further and linked their development programs that met the concerns of the staff, to the school's instructional and organizational needs (Task Force, 1986). Tyler (1973) suggested that not only should the in-service programs meet the needs of instructors and the organization, but it should be developed by both the individual instructors and the organization.

Methods to Achieve Quality. The in-service program was just one aspect of education that could be improved.



Many other areas of education were studied by special commissions, task forces and individual professional educators. Their recommendations for improvement of the condition of American education had several factors in common.

The Task Force on Teaching as a Profession commissioned by the Carnegie Forum (1986), suggested eight categories of changes to achieve quality in education. The Task Force suggested the creation of a National Board for Professional Teaching Standards. This board would establish standards for what teachers should know and be able to do. It would also certify those teachers who met the standard. The second recommendation was to provide a professional environment for teaching. Teachers should be able to decide how to meet state and local goals, but should also be held accountable for student progress. The third recommendation was to introduce a category of Lead Teachers to give teachers the opportunity to provide leadership and assistance to their colleagues.

The fourth suggestion that the Task Force (Task Force on Teaching as a Profession, 1986) presented was to require a bachelors degree in the arts and sciences as a prerequisite for the study of teaching. The development of a new professional curriculum in graduate schools of education was another suggestion. This curriculum would lead to a Masters

in Teaching degree. The sixth recommendation was to develop a program to prepare young minorities for the teaching profession. The seventh recommendation dealt with incentives for teachers. These incentives would be related to school-wide student performance. The last recommendation was to make teachers' salaries competitive with those in other professions.

The Governor's report on education (Task Force, 1986) consisted of the findings of seven different task forces, each studying a different aspect of education. The task force on teaching suggested that there must be more communication and cooperation between teachers and the public. The public must offer teachers reasonable salaries and a real voice in decisions. "Excellence must result in reward" (Sbaratta, 1983). Teachers, according to the Governor's report (Task Force, 1986), must offer the public a commitment to the highest standards of professional competence. They must work for results.

The task force on parent involvement and choice recommended the adoption of legislation permitting families to select from among kindergarten to twelfth grade public schools in their state. It encouraged the districts to develop more effective parent-involvement techniques. It also reminded parents that working closely with the schools

could help student achievement. The task force on readiness encouraged states to develop initiatives to help at-risk preschool children become ready for school (Task Force, 1986).

The task force on technology supported documentation about what is cost-effective and efficient at the school site. It supported research and development in education technologies and plans for using these technologies. It also recommended training for the teachers that used them. The use of schools year round was suggested by the task force on school facilities. Community education initiatives should also be researched (Task Force, 1986).

The task force on college quality stressed the importance of assessment of student learning. It also encouraged the assessment of the effectiveness of academic programs, curriculums, and institutions (Task Force, 1986). Effective program evaluation could preserve and enhance quality in education (Smith, 1985). In a supporting work by the task force on college quality, it was noted that in the past "quality has been judged by measurements such as faculty/student ratio, faculty research publications, number of library books, research equipment, caliber of student applicants, ability to place graduates in jobs and graduate schools, and alumni success." (Task Force on College Quality,

1986, p. 11).

Underlying all of these recommendations was the challenge to improve the school culture. Sapier and King (1985) summarized the school improvement factors with four elements; strengthening of teacher skills, continual updating of curriculum, improvement of the organization and involvement of the community. Purkey and Smith (1982) saw all of these factors in the culture of schools, which they felt was the foundation for school improvement.

Characteristics of Quality Organizations. In Kappa Delta Pi's study, One Hundred Good Schools (1984), the authors concluded that excellence was unrelated to level of education or to public or private control. They found that excellence was independent of the age of the student, it was independent of wealth or geographical location and excellence was not necessarily determined by the socioeconomic status of the student. The study went on to conclude that motivated administrators, teachers, and learners could take the schools and change them into places of quality and excellence.

According to John Roueche and George Baker (April, 1985), the expectations of our society have been reflected in the quality of education, and schools were no better or worse than those values held by society in general. Yet Tyler (1987) indicated that there were so many variations within

each school that the quality of education would vary markedly from school to school regardless of most reform movement plans generated by society.

The task force on leadership and management also discussed the characteristics of effective schools. It concluded that strong leadership, shared decision making, clear goals and effective instruction were important. The effective leaders had a vision of what they wanted their schools to be. These leaders could translate this vision into goals for the school and teachers. They created a supportive school climate and they monitored programs. The task force found that when state-sponsored training was matched to the skills principals needed, it was more effective. Incentives should be provided to districts to promote school renewal and an effective system of evaluation of principals should be developed (Task Force, 1986).

The research done by Squire, Huitt and Segaro (1985) found some of the same ingredients for successful schools that the Task Force discovered. Their research suggested that strong leadership and a positive school climate characterized successful schools. The positive climate included expectations for the success of students. Effective leadership included the use of consensus building and feedback.

The Commission of the Future of Community Colleges

commissioned by the American Association of Community and Junior Colleges (AACJC) defined the new vision for community colleges as "building community through dedicated teaching" (AACJC Commission of the Future of Community Colleges, 1988). The members of the community on successful campuses all had common goals and open communication and a commitment to excellence for all. The committee saw the building of communities as the mission of colleges that strove to be excellent. The meaning of community was explained in several ways.

One sense of community was the relationship of faculty and students. In a quality environment, this relationship was strong enough to sustain the intellectual and social environment of the college. Another aspect of community was the curriculum. It must be changed quickly and creatively to meet the changing educational needs. The curriculum in successful schools responded to the needs of the older citizens with enrichment offerings and to the needs of those wanting new skills by keeping up with new technologies (AACJC Commission on the Future of the Community Colleges, 1988).

The third part of the meaning of community dealt with the classroom. "Quality instruction should be the hallmark of the movement" (AACJC Commission on the Future of the

Community Colleges, 1988, p. 25). In successful schools, the highest performance was expected in each class and evaluation of results were consistent. Teachers and students were active partners in the learning process. The meaning of community extended throughout the campus. There was a joining of curricular and co-curricular activities, an attempt to build relationships and share goals. To be effective, the concept of community should also extend beyond the college to respond to local needs and beyond the present, to respond to future needs (AACJC Commission on the Future of the Community Colleges, 1988).

These colleges that met the definition of community given by the AACJC commission, were colleges at their most excellent form. The AACJC's commission believed these schools helped clarify personal values, enhanced competence and confidence, deepened and renewed channels of common life, and prepared students of all ages to participate more effectively in civic life (AACJC Commission on the Future of the Community Colleges, 1988).

The research compiled for What Works (Finn, 1986) gave a picture of effective schools. It listed some characteristics found in schools with high student achievement and morale. The schools had strong instructional leadership. The principal made clear, consistent, and fair decisions.

There were frequent reviews of student progress, and there was an emphasis on maintaining a safe and orderly climate. Basic skills and academic achievement were valued. Teachers had high expectations for student achievement and there was collegiality among teachers.

Dede and Freiberg (1986) separated their list of characteristics of effective schools into three components; leadership, efficacy and efficiency. Effective schools they believed, had leaders that set clear goals and maintained a stable school climate. They described efficacy as the measuring of success based on success beyond the school environment, and on non-academic accomplishments. It consisted of the teachers' and students' ability to combine human and intellectual capabilities. Efficiency was the third component of successful schools. New technologies should be used to join school, family, community, work place and media in an effort to obtain instructional effectiveness.

Roueche and Baker (April, 1985) in a national study of excellence in higher education, found that the eight characteristics of excellent companies listed by Peters and Waterman (1982), also described excellent educational institutions. Roueche and Baker (April, 1985) used this description of industrial excellence to compile their own list of characteristics of excellent schools. This list

also shared some common factors with those characteristics of effective schools described above.

The first characteristic of an excellent school according to Roueche and Baker (April, 1985), was that it should have a strategy consisting of clear goals that emphasize academic learning. The second attribute was that the structure should contain well-articulated curriculum. Systems, as a third characteristic should include organized evaluation of instructional improvement and of student progress. Their fourth category suggested that an emphasis on student response, abilities and participation should be characteristic of the school's style. Leadership should be stressed to all staff members as the fifth point. The sixth attribute included rewards and incentives for faculty and students and an emphasis on teamwork. Special skills should not go unnoticed. The last attribute was that of having shared values. This included a positive school climate and high expectations.

Roueche and Watkins (1982) outlined the importance of excellence in teaching as a characteristic of excellent schools. Outstanding teachers, they indicated, had high level cognitive skills. They were also highly motivated.

Several sets of competencies were listed by Baker, Boggs and Putnam (1983), as describing excellent teachers.

These competencies were: 1) a student-centered orientation, 2) value for the learning process, 3) need to influence individual behavior, and 4) belief that they had the power to produce a desired effect in the learner. The same researchers listed competencies that were identified in effective administrators. They were: 1) accepting responsibility for creating a climate conducive to effective learning, 2) practicing participative leadership, and 3) believing they had the power to affect outcomes.

A similar list of traits was compiled by George Conger (1984) in an effort to define effective instruction. He found that good teachers understood and liked people. Their teaching was grounded in sound scholarship and they knew what they were teaching. They used their personalities effectively. Their teaching had relevance to the students and they used teaching methods advantageously. They also showed enthusiasm for what they do. Even though Dr. Jones of Parkland College stated that it was impossible to define excellence in teaching, he agreed that enthusiasm was a necessary ingredient (1982).

Summary. Roueche and Baker (April, 1985) compared the following excerpt with attempts to describe excellence in education.

> By 1967 the Supreme Court of the United States had abandoned a decade-long effort to define obscenity.

> The court was hopelessly divided by the justices' personal definitions of what was obscene. However, in writing an opinion in a major case, Justice Potter Stewart conceded the subjective nature of any definition but concluded with what has since been labeled the Stewart Factor. Stewart wrote that while he may not be able to define obscenity, "I know it when I see it." (p. 18)

Although one may have an intuitive picture of excellence in schools, a quantifiable definition would be necessary if measurements were to be made. If quality could be defined, we should be able to work toward it and expect it in our institutions much as industry has been working toward and expecting quality in their companies.

According to Crosby (1979), in business and industry, quality simply has meant conformance to the standards. If any changes were to be made, plans had to be made and goals had to be established (Wattenbarger & Nickel, 1987). Goals could be set by agreed upon standards and achievement could be measured by them. In education, if standards were listed that represented quality, goals could be set and conformance to those standards could also be measured.

Use of the Literature

In this study, the work done by Crosby (1979) for industry and his definition of quality as used in industry (conformance to the standards), were incorporated into a training program at an educational institution. The development of the training class about quality was done following

many of the suggestions outlined above, for a successful in-service program.

There was active participation by staff and administration in the training program's activities. Specific goals were set and activities were individualized. Measurement and evaluation was done with the use of a list of standards for excellence in education. This set of standards was used as an instrument to assess any change in quality of instruction after the staff completed the training.

The methods used in this study and the presentation and analysis of the data are detailed in the following chapters. The last chapter presents conclusions and recommendations for further study.

CHAPTER III

METHODOLOGY

Introduction

The literature generated by industry and the literature generated by education has indicated parallel concerns about quality and how to achieve it. If a plan for achieving excellence in business and industry were used in an educational institution, and if this plan incorporated the characteristics for excellence outlined in the literature from both areas, would it be effective in improving the quality of the institution? The following procedures were used to measure and analyze the results of such a plan.

Procedures

Crosby's model was selected to be used at Fox Valley Technical College (FVTC) for improving quality. Following the guidelines of that model, a group of faculty members were trained in Crosby's fourteen step program. These instructors then developed the curriculum for the quality training class, Quality Instructor Education (QIE) for the faculty of FVTC. Each faculty member would take this 20 hour QIE class during the 1987-88 school year (see Appendix C).

The investigator in this study contacted the District Director of FVTC, Dr. Spanbauer, first to get consent to measure the results of the training program and then later to get approval of the instrument to be used and the method of obtaining the data. The instrument used was a self-administered questionnaire. Although there are limitations to a self-administered survey since answers rely on the subjects opinions, this survey instrument was selected because of its nationally validated standards reflecting excellence in education.

The first QIE class met in the summer of 1987. The members of the class were administered the questionnaire directly before beginning the training. On the first day of the school year in the fall of 1987, the rest of the faculty were administered the survey during a faculty in-service meeting. Demographic information was requested on the survey by the investigator. This information included department, division, age and sex. Respondents returned the completed surveys to monitors before leaving the meeting. QIE training classes were held during each of the next three twelve-week blocks. The survey instrument was administered to the faculty a second time as a post-test, at the end of the school year (spring, 1988). Several questions were included at the end of the survey (questions 53-55) by the investiga-

tor to help in the analysis of the data. Question 53 asked if the respondent had filled out the survey previously, as a pre-test. Question 54 asked if the respondent had taken the QIE class. The last question asked when the QIE class was taken.

One group consisting of 32 faculty members did not take the training program in order to serve as a comparison group. They were also administered the survey instrument at the end of the school year as a post-test. Their results were compared with the results of the groups that took the training. The members of this group were selected in part by chance of scheduling. They could not fit a QIE class into their schedule during the school year. The remaining members were chosen by random selection to help control variability.

Survey Instrument

The survey instrument consisted of global standards of excellence for each of several categories of education. Beneath each of these global standards were statements further describing the standard. The respondents then indicated by marking the appropriate space on the answer sheet, whether their departments exceeded, met, or fell below each of those standards.

The standards were developed for use at the secondary, postsecondary, and adult levels. They were developed

and validated nationwide as a means for assessing the quality of education and as a basis for achieving excellence (Staff for Standards Project, 1985). Permission to use the instrument was obtained by the investigator from the Project Director for developing the standards, Dr. Calhoun of East Carolina University.

Only those sections of the Standards for Excellence in Business Education that were related to instruction and curriculum were used in this study. Sections that were related to financial resources, support systems and public relations were not included by the investigator because they were not directly related to improvement of instruction and faculty members would not have the information to respond to them. Including those sections would also make the instrument unnecessarily long.

QIE class

FVTC used an open-entry, open-exit system of enrollment. This meant that classes could range anywhere from several days to eighteen weeks in length. However, many of the classes fit into a 12-week block of time. The faculty quality training classes were scheduled for a total of 20 hours, two hours per week for ten weeks. Each of these ten-week classes fell within a twelve-week block to enable faculty members to complete the class before having a change

in their own teaching schedule that might interfere with the sessions.

All instructors were required to attend a class sometime during the 1987-88 school year. Determination of members of each class rested first on when the class would fit in the individual's schedule. Some randomization was obtained by selecting names drawn from a list of faculty members to fill openings in classes. These people were called by the investigator and were requested to attend the class being filled.

The QIE class consisted of nine modules (see Appendix C). The first module defined quality and discussed quality concepts in both the service and product industries. Quality improvement was next discussed using explanations of Crosby's model and application of it to FVTC. The need of the quality improvement process was the topic of the third module with emphasized the benefits of it.

In module four, the necessity of establishing valid requirements in the educational environment, was covered. Next, the importance of being in a prevention mode was explained. The sixth module gave the class members an understanding of the price of nonconformance. The cost of quality was compared to the price of lack of quality. The role of the instructor and the importance of teamwork in the

quality process were seen in the next two units. In the last module, class members were encouraged to work in teams to use their basic knowledge of quality concepts to contribute new ideas to FVTC.

Statistical Procedures

To test the hypotheses, numerical values were assigned to each of the three possible answers to the questions. An answer of exceeds the standards was given a value of one, an answer of meets the standards was given a value of two and an answer of below standard was given a value of three. Totals of each individual's answers to questions four through fifty-two were also generated to enable the investigator to analyze results by individual question, or by the survey as a whole unit.

The first hypothesis was that the training program had no effect on the quality of instruction by the faculty. To test for this a t-test was done on the total scores (summing the responses to questions 4 through 52) of the respondents' pre-tests and their post-tests. A separate t-test was also done on each question, comparing pre-test and post-test results. Analysis could then be done on each question individually and on the survey as a whole.

The second hypothesis was that there was no difference across divisions in the quality of instruction by

faculty after taking the training program. To test this hypothesis, an analysis of variance (ANOVA) was done on post-test results across the results of question three on the survey. Question three asked the respondent to indicate in which of the five divisions at FVTC he/she worked. The ANOVA was done on total post-test scores (questions 4 through 52). It was also done on pre-test and post-test scores for each of the questions individually.

The third hypothesis was that there was no difference in the quality of instruction by male instructors who took the training program compared with female instructors who took the training program. A t-test was done using sex as the independent variable and the total of the post-test scores (questions 4 through 52) as the dependent variable.

The fourth hypothesis was that there was no difference in the quality of instruction among the groups of; those taking the pre-test and training (group 1), those taking the pre-test but not the training (group 2), and those not taking the pre-test but taking the training (group 3). An ANOVA was done on the total post-test scores by the three groups as described in the hypothesis. An individual was considered to be a member of group 1 if he/she answered question 53 "A" (yes, the respondent filled out the survey before) and question 54 "A" (yes, the respondent took the

quality training class). An individual was considered to be in group 2 if he/she answered question 54 "B" (the respondent did not take the quality training class). The respondent was considered to be in group 3 if he/she answered question 53 "B" (the respondent did not fill out the survey once before) and question 54 "A" (yes, the respondent took the quality training class).

The fifth hypothesis was that there was no difference in the quality of instruction by those completing the training ten months previous to taking the post-test, compared with those completing the training eight months previous to taking the post-test, compared with those completing the training five months previous to taking the post-test, compared with those completing the training one month previous to taking the post-test. An ANOVA was done using the total post-test scores as the dependent variable and the term when the respondents took the training session as the independent variable. The answers to question 55 of the survey were used to determine the term when the respondents took the QIE training class.

The statistical procedures in this study were done with the use of SPSSX statistics package run on an IBM 4381 mainframe computer system. After the respondents to the survey recorded their answers on standard answer sheets, the

data were entered into the computer with the use of an optical scanner. The SPSSX programs were then run using the data that had been entered. Analysis was done on the results of these programs.

The responses to the survey questions were analyzed as one total score to obtain a general picture of the results. Comparison tests were run on individual questions to determine if changes took place in certain areas of the instructional environment over others. The following two chapters of this study discuss and analyze the data that were obtained.

CHAPTER IV

PRESENTATION OF DATA

Hypotheses

The data obtained in this study, were used to test the following five hypotheses;

1. The training program had no effect on the quality of instruction by the faculty.
2. There was no difference across divisions in the quality of instruction by faculty after taking the training program.
3. There was no difference in the quality of instruction by male instructors who took the training program compared with female instructors who took the training program.
4. There was no difference in the quality of instruction among the groups of; those taking the pre-test and training, those taking the pre-test but not the training, and those not taking the pre-test but taking the training.
5. There was no difference in the quality of instruction by those completing the training ten months previous to taking the post-test, compared with those completing the training eight months previous to taking the post-test, compared with those completing the training five months previous to taking

the post-test, compared with those completing the training one month previous to taking the post-test.

These hypotheses are discussed individually in this chapter, following a description of the population that was used in this study.

Study Population

There were approximately 240 faculty members employed on contract at Fox Valley Technical College (FVTC) during the 1987-88 school year. Out of these members, 202 completed the post-test and 168 completed the pre-test. On the pre-test, males comprised 53.6% of the respondents, females comprised 42.9% of the respondents (3.5% did not respond to that question). On the post-test, males comprised 51.0% of the sample, females comprised 45.5% of the sample (3.5% did not respond to that question).

The age of the pre-test respondents ranged as follows; 1.2% were 25 years old or younger, 4.8% were between 26 and 30 years old, 14.3% were between 31 and 35 years old, 48.2% were between 36 and 45 years old, and 30.4% were 46 years old or older. Out of the total sample, 1.1% did not respond to the question regarding age. The post-test respondents varied as follows; 0.0% were 25 years old or younger, 9.9% were between 26 and 30 years old, 15.3% were between 31 and 35 years old, 44.1% were between 36 and 45 years old, and

25.7% were 46 years old or older. 5.0% did not respond to that question.

Each of the faculty members worked in one of five divisions at FVTC. In filling out the pre-test, 12.5% of the respondents indicated that they worked for the agriculture/ home and consumer science division, 16.7% worked for the business education division, 28.0% worked for special services/general education, 17.3% were in the health and human services division and 24.4% were in the trades and industry division. Of the total sample, 1.1% did not respond to this question.

Of those faculty members completing the post-test, 11.9% were in the agriculture/home and consumer science division, 19.8% were in the business education division, 30.2% were in the special services/general education division, 14.3% were in the health and human services division and 19.8% were in the trades and industry division. There were 4% of the total sample that did not respond to this question.

Effect of QIE training

Introduction. To test the effect of the training program on the quality of instruction, a t-test was done on the total scores of the pre-test and the total scores of the post-test. Lower scores indicated a more favorable response

related to meeting or exceeding the standards. A response of exceeding the standards was given a score on one. A response of meeting the standards was given a score of two. A response of below the standards was given a score of three. The scores of all of the questions from four through fifty-two were accumulated to give the total score for each individual survey. The results of the t-test on the total scores are found in Table 1.

TABLE 1

T-TEST COMPARISON OF PRE-TEST TOTALS AND POST-TEST TOTALS

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	168	86.62			
			3.59	366.58	0.000
Post-test	202	79.15			

T-tests were also run on the responses to each question from four through fifty-two. (See Appendix B for a sample of the survey instrument.) This enabled the investigator to check for significant changes in responses to

individual items within each of the two main sections of the survey. The two sections were; instructional staff, and curriculum and instruction. The results of all of these t-tests are seen in Appendix A. Those t-tests that resulted in a significant difference at the .01 level are found in Table 2.

Thirteen of the forty-nine questions tested were found to have a significant difference from pre-test responses to post-test responses, at a .01 level. In each of these cases the post-test results were lower (more favorable to meeting or exceeding the standards of excellence) than the pre-test results.

All except three of the questions had mean scores that decreased from pre-test to post-test. The three questions that showed an increase in the mean of the responses, were 17, 46, 50. However, none of these had statistically significant increases according to the t-test results. The overall mean of the responses to questions four through fifty-two did decrease significantly at the .01 level from 86.62 to 79.15.

General Results. There was a significant difference between the post-test and pre-test results, at the .01 level. Since the post-test mean was less than the pre-test mean, respondents rated their departments as being closer to

TABLE 2

T-TEST COMPARISON OF PRE-TEST AND POST-TEST QUESTIONS WITH SIGNIFICANT RESULTS

Question	Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
4	Pre-test	168	1.69	2.57	358.87	0.010
	Post-test	198	1.53			
7	Pre-test	168	1.82	3.07	353.47	0.002
	Post-test	199	1.63			
8	Pre-test	168	2.04	4.32	357.81	0.000
	Post-test	197	1.74			
10	Pre-test	168	2.15	4.08	350.44	0.000
	Post-test	197	1.87			
14	Pre-test	168	2.18	3.30	352.96	0.001
	Post-test	200	1.92			
16	Pre-test	168	1.98	2.73	359.10	0.007
	Post-test	200	1.78			
18	Pre-test	168	1.70	2.87	337.04	0.004
	Post-test	197	1.51			

TABLE 2 cont.

T-TEST COMPARISON OF PRE-TEST AND POST-TEST QUESTIONS WITH SIGNIFICANT RESULTS

Question	Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
20	Pre-test	166	1.80	3.35	332.86	0.001
	Post-test	200	1.57			
26	Pre-test	162	1.93	2.72	336.57	0.007
	Post-test	199	1.72			
36	Pre-test	167	1.87	3.22	329.21	0.001
	Post-test	191	1.64			
38	Pre-test	159	2.06	3.13	317.41	0.002
	Post-test	190	1.82			
44	Pre-test	162	1.99	2.94	327.75	0.004
	Post-test	192	1.77			
52	Pre-test	147	2.51	4.12	321.01	0.000
	Post-test	191	2.19			

exceeding the standards of excellence when they took the post-test than when they took the pre-test. The mean of the total score for the pre-test respondents was 86.62 while the mean of the total score for the post-test respondents was 79.15.

Instructional Staff. The first five of the questions that showed significant changes in the responses to them, were in the instructional staff section of the survey. The first of these was number 4 which questioned whether the faculty members were qualified to teach their assigned courses. Question 7 was also rated significantly different from pre-test to post-test. This question dealt with the faculty members leadership role. Question 8 which discussed the faculty's membership in professional organizations, also showed a positive change in responses, significant at the .01 level.

Staff development and evaluation were the topics of questions 10 and 14 both of which had more favorable responses on the post-test. They asked if written professional development plans were followed and if faculty members were regularly evaluated.

Questions in this instructional staff section that also showed a favorable difference from pre-test to post-test, but only at a .05 level of significance were; 6, 9, 11,

and 13. They dealt with faculty members' human interaction skills, attendance at professional meetings, participation in staff development activities and evaluation of their own effectiveness of instruction.

Curriculum and Instruction. The first part of the curriculum and instruction section on the survey instrument involved planning, developing and using appropriate curriculum. In this section, the responses to questions 16, 18, 20, and 26 showed a positive difference from pre-test to post-test responses at the .01 level of significance. Question 16 described the appropriate groups that should be involved in developing curriculum. Number 18 questioned whether the curriculum was designed to develop student talent, creative ability, positive self-concept, and individual potential. Number 20 checked that the curriculum ensured that students could progress on the basis of the competencies they developed.

The last questions with results that indicated a positive difference at the .01 level of significance, were numbers 36, 38, 44 and 52. These questions were found in the portion of the curriculum and instruction section dealing with instructional content and activities. Statements 36 and 38 related to course guides and their content. Number 44 discussed the accommodation of individual learning styles of

students through the use of a variety of instructional activities. Question 52 also dealt with the accommodation of individual learning styles of students, but this time through the instructors' use of resources including telecommunications.

The responses to questions 19, 23, 25, 27, 28, 29, and 42 showed a favorable difference from pre-test to post-test but only at a .05 level of significance. These questions dealt with whether the curriculum met the needs of the community, provided for basic business understanding, communication, decision making, and interpersonal behavior skills. The questions asked if the curriculum provided for skills related to work ethics, and if instructional activities that were used to accommodate individual learning styles, included data communications.

Responses by Division

The post-test total scores showed no significant difference at the .01 level, in how each of the divisions responded to the survey. An analysis of variance produced an F value of .043 which was significant at a .05 level (see Table 3). The mean scores ranged from 68.97 (n=29) for the health and human services division, to 83.73 (n=40) for the business education division. The special services/general education division had a mean score of 82.72 (n=61), the

TABLE 3

ANOVA OF POST-TEST SCORES BY DIVISION

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4958.489	1239.622	2.510	.043
Within groups	189	93355.511	493.945		
Total	193	98314.000			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	75.83
Business Education	40	83.73
Special Services/General Education	61	82.72
Health & Human Services	29	68.97
Trades & Industry	40	77.78
Total	194	79.00

agriculture/ home and consumer science division had a mean score of 75.83(n=24), and the trades and industry division had a mean score of 77.78 (n=40).

T-tests were done on each of the survey statements 4 through 52, by division (see Appendix A). The questions that showed a significant difference in how the division members responded, at the .01 level, were; 8, 10, 22, 29, 35, 43, 45, 46, 47 and 49 (see Table 4). At the .05 level of significance, responses to questions 9, 13, 27, 28, 32, 33, 34, 37, 41, 48 and 51 showed a difference of responses by division. Out of these questions, the health and human service division consistently had the most favorable responses. In 17 out of these 21 questions, that division had the low mean score. The agriculture/home and consumer sciences division had the low mean score for the other four questions. The business education, special services/general education and trades and industry divisions generated 11, 8 and 4 of the high mean scores of those questions, respectively. There were ties for high score in two questions, therefore 23 high mean scores were indicated for the 21 questions.

The results of t-tests done on total scores comparing pre-test and post-test results by division can be found in Appendix A. One of the divisions had significant differences in results at the .01 level. In the health and human

TABLE 4

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 8

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	11.765	2.941	7.248	.000
Within groups	185	75.077	.406		
Total	189	86.842			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.63
Business Education	40	1.83
Special Services/General Education	58	2.05
Health & Human Services	28	1.43
Trades & Industry	40	1.48
Total	190	1.74

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 10

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	9.063	2.266	5.949	.000
Within groups	184	70.080	.381		
Total	188	79.143			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.65
Business Education	38	2.16
Special Services/General Education	59	2.00
Health & Human Services	29	1.59
Trades & Industry	40	1.68
Total	189	1.86

TABLE 4 cont.

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 22

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.326	1.332	4.113	.003
Within groups	186	60.223	.324		
Total	190	65.550			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.46
Business Education	40	1.63
Special Services/General Education	59	1.73
Health & Human Services	29	1.28
Trades & Industry	39	1.74
Total	191	1.61

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 29

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	6.313	1.579	4.353	.002
Within groups	185	67.081	.363		
Total	189	73.395			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.38
Business Education	39	1.77
Special Services/General Education	60	1.77
Health & Human Services	28	1.32
Trades & Industry	39	1.54
Total	190	1.61

TABLE 4 cont.

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 35

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.016	1.254	3.946	.004
Within groups	180	57.201	.318		
Total	184	62.216			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.50
Business Education	38	1.66
Special Services/General Education	57	1.46
Health & Human Services	28	1.14
Trades & Industry	38	1.61
Total	185	1.49

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 43

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.1246	1.281	4.213	.003
Within groups	180	54.735	.304		
Total	184	59.860			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.43
Business Education	38	1.68
Special Services/General Education	57	1.70
Health & Human Services	28	1.25
Trades & Industry	39	1.46
Total	185	1.55

TABLE 4 cont.

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 45

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	14.761	3.690	7.285	.000
Within groups	176	89.151	.507		
Total	180	103.912			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.42
Business Education	38	2.18
Special Services/General Education	57	2.25
Health & Human Services	27	1.81
Trades & Industry	35	1.83
Total	181	1.98

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 46

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	6.979	1.745	5.676	.000
Within groups	176	54.104	.307		
Total	180	61.083			

Group	Count	Mean
Agriculture/Home & Consumer Science	22	1.36
Business Education	39	1.51
Special Services/General Education	59	1.80
Health & Human Services	26	1.31
Trades & Industry	35	1.37
Total	181	1.53

TABLE 4 cont.

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 47

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	20.947	5.237	10.706	.000
Within groups	175	85.603	.489		
Total	179	106.550			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.42
Business Education	38	1.63
Special Services/General Education	55	2.24
Health & Human Services	27	1.33
Trades & Industry	36	1.83
Total	180	1.78

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 49

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.429	1.357	3.616	.007
Within groups	179	67.180	.375		
Total	183	72.609			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.50
Business Education	39	1.69
Special Services/General Education	59	1.61
Health & Human Services	27	1.22
Trades & Industry	35	1.77
Total	184	1.59

services division, the mean scores dropped from 82.62 on the pre-test (n=29) to 68.97 on the post-test (n=29). The lower scores are more favorable to exceeding the standards of excellence than higher scores.

Two of the divisions had significant differences in results at the .05 level. The trades and industry division showed a decline in mean from 89.24 (n=41) to 77.78 (n=40). In the special services/general education division, there was also a decrease in means. They decreased from 90.28 (n=47) to 82.72 (n=61) which was a significant change at the .05 level.

The business education and agriculture/home and consumer science divisions showed no significant change in mean scores. The business education division's mean pre-test score was 90.36 (n=28) and its mean post-test score was 83.73 (n=40). The agriculture/home and consumer science division's mean pre-test score was 74.29 (n=21). That division's mean post-test score was 75.83 (n=24).

Responses by Sex

A t-test was run comparing total post-test scores by male respondents to total post-test scores by female respondents (see Table 5). There was no statistically significant difference in the results. The mean score for males was 79.97 while the mean score for females was 78.08. There were

TABLE 5

T-TEST COMPARISON OF POST-TEST BY SEX

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Males	103	79.97	0.59	192.53	0.556
Females	92	78.08			

T-TEST COMPARISON OF PRE-TEST & POST-TEST - MALES

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	90	87.57	2.52	184.62	0.013
Post-test	103	79.97			

T-TEST COMPARISON OF PRE-TEST & POST-TEST - FEMALES

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	72	86.08	2.72	161.42	0.007
Post-test	92	78.08			

103 males and 92 females responding to the post-test.

The t-test comparing pre-test and post-test results for males showed a difference but only at the .05 level of significance. The same test for females showed a significant difference at the .01 level. The mean score for males went from 87.57 on the pre-test to 79.97 on the post-test. The mean score for females changed from 86.08 on the pre-test to 78.08 on the post-test (see Table 5).

Responses by Three Treatment Groups

An ANOVA test was done on the total post-test results as they were divided into three different groups (see Appendix A). The first group consisted of individuals who took the pre-test and the QIE class (n=130). The second group consisted of respondents who took the pre-test but did not take the QIE class (n=32). The last group consisted of subjects who did not take the pre-test and did take the QIE class (n=31).

The mean score of the first group was 79.83. The mean score of the second group was 86.47 and the mean score of the third group was 81.98. The results of the ANOVA indicated that there was no significant difference in the responses of each of these three groups (see Table 6).

Responses by Time Lapse

Comparison groups were formed in order to measure

TABLE 6

ANOVA OF POST-TEST SCORES BY TREATMENT GROUPS

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	2	1163.855	581.928	1.343	.264
Within groups	190	82319.098	433.258		
Total	192	83482.953			

Group	Count	Mean
Took pre-test and QIE	150	79.83
Took pre-test but not QIE	32	86.47
Did not take pre-test did take QIE	11	80.98
Total	193	80.98

TABLE 7

ANOVA OF POST-TEST SCORES BY TIME LAPSE

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	3	258.454	86.151	.162	.922
Within groups	171	91209.066	533.386		
Total	174	91467.520			

Group	Count	Mean
QIE 10 months previous to post-test	16	74.38
QIE 8 months previous to post-test	81	77.78
QIE 5 months previous to post-test	51	78.25
QIE 1 month previous to post-test	27	79.30
Total	175	77.84

whether there was any difference in results depending on the amount of time lapsed after the QIE class was taken and before the post-test was completed. The first group (n=16) completed the QIE class ten months previous to taking the post-test. This QIE class was held in the summer term of 1987. The second group (n=81) completed the QIE class eight months previous to taking the post-test. These QIE classes were held in the fall term of 1987. The third group (n=51) completed the QIE class five months previous to taking the post-test. These QIE classes were held in the winter term of 1987-88. The last group (n=27) completed the QIE class one month previous to taking the post-test. These QIE classes were held in the spring term of 1988.

An ANOVA test was done to determine if there were any statistically significant differences in the responses by the four groups. The first group had a mean post-test score of 74.38. The second group had a mean post-test score of 77.78. The third group had a mean post-test score of 78.25, while the last group had a mean post-test score of 79.30. There was no statistical difference in these scores as determined by the ANOVA test (see Table 7).

Summary of Data

There was an overall decrease in the mean scores of the post-test when compared with the mean scores of the

pre-test. A decrease in scores indicated an increase in meeting or exceeding the standards of excellence. There was no significant difference at the .01 level in how members of each division responded to the post-test, however only one of the divisions showed a statistically significant decrease in scores from pre-test to post-test at that level of significance. Two other divisions showed a decrease in mean scores significant at the .05 level. The remaining two divisions showed no statistically significant change from pre-test to post-test. The responses by males on the post-test showed no statistical difference to the responses by females. Both groups showed a decrease in mean scores from pre-test to post-test.

Although the mean post-test scores of the group of subjects not taking the QIE class were higher than the other two groups that did take the class, the results were not shown to be significantly different. Of the two groups taking the class, whether they took the pre-test or not, did not make a significant difference in their mean post-test results. While the entire sample saw a significant decrease in their post-test mean scores, which of those three groups they were in did not make an apparent difference.

Similarly, although the mean scores decreased as the time between taking the QIE class and the post-test in-

creased, there was no statistically significant difference in those scores. All groups combined showed a significant decrease in results, but there was no one group related to time lapse between QIE class and testing, that showed a significantly greater decrease in mean scores than another group.

An analysis of the data that were presented, follows in the next chapter of this study. The results of that analysis is then used to determine the significance of the results and to make recommendations for further study.

CHAPTER V

ANALYSIS OF DATA

Introduction

The data gathered in this study were presented in the previous chapter. An analysis of that data and its meaning as related to the five hypotheses set forth in this study, are now presented. The sample used was the faculty at Fox Valley Technical College (FVTC). The survey instrument used as a pre-test and post-test can be found in Appendix B. Further conclusions from this analysis and recommendations for follow-up studies, can be found in chapter 6.

Hypothesis One

The first hypothesis considered in this study, was that the training program had no effect on the quality of instruction by the faculty. Since there was a significant difference at the .01 level between the faculty's responses to the pre-test and their responses to the post-test, this null hypothesis was rejected.

The faculty of FVTC as a whole, rated their departments more favorably on the post-test than on the pre-test. This indicated that they believed their departments met or

exceeded more of the standards for excellence after they had taken the Quality Instructor Education class (QIE) than before they had taken it.

The items on the survey instrument were divided into two major sections; instructional staff, and curriculum and instruction. It was further subdivided into more specialized topics (see Appendix B). By looking at the responses that were made to the individual questions, it could be seen if some areas were judged by the faculty to have improved more than others. None of the questions showed a significant increase in raw score. An increase in raw score would have indicated an unfavorable change in response (1 = exceeds the standard, 2 = meets the standard, 3 = below the standard). Only three questions showed any increase in raw score from pre-test to post-test but the increases were not statistically significant.

The first topic (questions 4 through 7) under the instructional staff section of the survey, was on the subject of qualifications. The faculty rated the instructors in their departments as more qualified to teach the content of courses and more able to provide positive leadership, after going through the QIE training. There was a less significant change seen in desirable human interaction skills by the faculty. The only question in this area that showed no

significant change was related to the faculty members' communication skills. To improve written and oral communication skills, more specialized instruction than QIE may be needed.

In the portion of the survey discussing professionalism, (questions 8 and 9), favorable changes were seen in both questions. It appeared that the faculty viewed their departments as being more professional, as indicated by professional organization memberships and meetings, after they took the QIE training than before taking it. The QIE training may have provided the encouragement needed for the faculty to take a more active part in professional organizations.

The staff development portion of the survey consisted of three items (questions 10, 12 and 12). Faculty members appeared more likely to follow a written plan for professional development after going through QIE than before. Though the change in responses was less significant regarding participation in staff development activities, there was also a favorable change. There was no change in responses from pre- to post-test regarding the inclusion of an orientation program for new faculty. Since most new faculty members start in the fall block and the post-test was given in the spring block, this lack of change could be an indication of lack of opportunity to improve or include new orientation

programs before taking the post-test.

The evaluation portion of the survey contained two items (questions 13 and 14). Staff members indicated that there were more regularly conducted faculty evaluations at the time of the post-test than when they filled out the pre-test. Less significant, but still showing a favorable change was the teachers' use of evaluations to measure their own effectiveness of instruction. Since the QIE classes stressed the importance of measure, the results may indicate a positive change following those classes.

The responses to the instructional staff section of the survey that were just discussed, indicated a positive change in how the faculty perceived their qualifications, professionalism, staff development and evaluation techniques. It appeared that improvements had been made in all of these aspects of instructional excellence.

The second section of the survey involved curriculum and instruction. The main divisions of this section were; curriculum, course objectives, and instruction. The first set of items (questions 15 through 20) in the curriculum part of this section represented planning.

Only three of the questions that were related to planning of curriculum, showed significant changes (questions 16, 18 and 20). The faculty rated their departments' use of

representatives from a variety of areas (adminstration, advisory committees, faculty and students) for the development and revision of curriculum. Their responses indicated this use of various representatives was more prevalent after the QIE class than before. This might be seen as a change toward a more holistic approach to curriculum development than before.

The faculty also viewed their curriculum as more likely to develop student talent, creative ability, positive self-concept and individual potential when they responded to the post-test as opposed to when they took the pre-test. Their responses also indicated an improvement in providing for the students articulation among levels of classes. Since the importance of the student as a customer was stressed in QIE, these favorable changes seemed appropriate.

Although there was a favorable change in the design of the curriculum to meet the evolving needs of the employment community, it was not as significant as the three items described above. The item regarding the curriculum and its reflection of the stated philosophy and objectives of the individual and school program showed no significant change, nor did the question involving the provision of curriculum to ensure that students achieve on the basis of competencies previously developed. (This was one of the three items that

showed an increase in mean score, though a statistically insignificant one.)

It should be noted that the mean scores of each of these three items that did not show a significant favorable change (questions 15, 17, and 19), started with low pre-test scores (1.48, 1.55, 1,53) when compared with the average pre-test score for all individual questions (1.77). This indicated that these items were originally viewed as being favorably met and therefore had less possibility for improvement. The responses to the post-test for those same questions were still more favorable than the responses to the other post-test items in this planning portion of the survey.

The only question that was in the development category of curriculum (question 21) did not show a significant change. It however, also started with a mean score (1.54) below the pre-test mean score per question (1.77). Its post-test score (1.49) was also below the mean post-test score per question (1.62). The indication was that the faculty believed before QIE training took place, that departments were already developing course content from course objectives and the curriculum reflected approved curriculum resources. This did not leave as much opportunity for a significant change.

There were eight items under the competencies section

of curriculum (questions 22 through 29). The only item in this section that showed a significant favorable difference involved the provision for the development of skills and knowledge related to computer literacy (question 26). Since the administration at Fox Valley Technical College (FVTC) has been recommending and encouraging the use of computers in all areas of instruction, the change in responses to this question could be more of a reflection of that encouragement rather than QIE class.

All other questions in this competencies portion of the survey showed favorable changes in the means of the responses but not at a .01 level of significance. Those items that did show a favorable change that might be considered significant (.05 level) concerned the curriculum's provision for development of skills and knowledge related to; basic business understanding, communication, decision making, interpersonal behaviors and work ethics. It did not appear that the faculty saw any change in the curriculum's provision for understandings of professional positions or career awareness as indicated by their responses to question 24.

Two questions made up the section on course objectives (questions 30 and 31). The mean scores of the responses to these questions decreased from pre-test to post-test, but not enough to show that there was a significant improve-

ment. The faculty did not change in their view of writing objectives in measurable terms or the use of the objectives for planning, implementing, and evaluating content and instructional methods. Specifics about writing objectives were not covered in QIE classes, although the importance of describing things in measurable terms, and of having objectives, was covered. Evidently, these concepts did not significantly change the faculty's responses to these items at the time of the post-test.

The instruction portion of the survey was divided into the topics of content and activities. The content area contained nine questions (questions 32 through 40). The questions were related to course guides. They were to be rated by their inclusion of estimated time requirements for completing major units of study and community resources needed for completing major units of study. The responses to two of these items showed significant favorable changes (questions 36 and 38). These two questions had the highest pre-test scores (1.87 and 2.06 respectively) in this section on content, which indicated they were seen as the items least meeting the standards for excellence. This may have indicated that this was an area with room for improvement.

Four of the other questions in that same section (questions 32, 33, 34, 35) started with pre-test scores below

the mean score for individual questions. (The mean pre-test score overall was 1.77. The mean pre-test scores for the four questions were 1.58, 1.47, 1.60 and 1.54 respectively.) The responses to these questions did not show a significant change. However, there was a smaller possible interval for change since they were rated favorably in the pre-test. The post-test scores for those questions were also less than (more favorable) the average post-test response. (The mean post-test response was 1.62. The mean post-test responses for the four questions were 1.53, 1.43, 1.52 and 1.49 respectively.)

It appeared therefore, according to the responses to those four questions, that the faculty believed that course guides were used by teachers, these guides outlined major units of study, they specified competencies to be acquired and they specified the sequence of instructional activities. Since the responses to these items were favorable before the faculty took QIE training and after they completed the training, it cannot be concluded that QIE made a difference.

Two questions (questions 39 and 40) on the same topic of content, did not show a significant change, nor did they have pre-test scores that were lower than the overall mean pre-test score. (Pre-test mean scores were 1.83 and 1.95. It should be noted that although these means are high related

to the average response per question, they still represented a slightly better than "meeting the standards" response). One of the two questions dealt with course guides specifying a variety of evaluation methods based on stated competencies. It cannot be concluded that QIE training had an effect on the responses to that question.

The other question on the topic of content dealt with written lesson plans being available and used. It should be considered that FVTC used a computerized procedure for developing curriculum called Wisconsin Competency-Based Occupational Curriculum Data System (WisCom). All aspects of the curriculum including what could be called lesson plans were included in the WisCom books that were developed for each course. The term lesson plan was generally not used at FVTC to describe the organization of daily instructional activities. If the term WisCom were substituted for the term lesson plans in this question, the results might have been more favorable.

The activities part of the section on instruction, consisted of the remaining twelve questions (questions 41 through 52). The faculty judged their departments to improve significantly in their accommodation of individual learning styles of students by using a variety of instructional activities and resources including discovery learning

and telecommunications (questions 44 and 52).

The item on telecommunications had high pre- and post-test scores (2.51 and 2.19 respectively) indicating responses representing a rating less than meeting the standards for excellence. This was not surprising since telecommunications would not necessarily be appropriate for all classes so there would be some faculty members that have not used this media. However, it was viewed that there has been a significant increase in its use by the faculty in general.

The remaining questions in this activities section did not show significant changes. It cannot be concluded that there was a difference after the QIE training, in those cases. Faculty viewed their departments as being the same with regard to accommodating individual learning styles of students through the use of a variety of courseware, demonstrations, field trips, hands-on learning, field experiences, lecture/discussions, oral presentations, problem solving, and speakers.

There was an indication of a favorable change, though not as significant as the changes on the use of telecommunications and discovery learning, in the response to the item (question 42) related to the use of data communications. Faculty members viewed their departments as using data

communications more now than previous to the QIE training. This again, could be due to the encouragement at FVTC to use computer technology, rather than due to the QIE training.

It did appear that the training program had an effect on the quality of instruction as measured by the survey on standards for excellence used in this study. There was a significant difference in responses to the survey in general. Most of the significant changes were in the sections regarding instructional staff and the planning of curriculum. Many of the other curriculum items that did not show a significant change were already rated favorably by the faculty in the pre-test and therefore had less of an interval for change. The other area that in general did not show a change was the use of various types of instructional activities by the faculty. Although the general post-test results did indicate a favorable change in instruction, an analysis of the data related to the next four hypotheses added conflicting information.

Hypothesis Two

The second hypothesis presented in this study was that there was no difference across divisions in the quality of instruction by faculty after taking the QIE training program. This null hypothesis was not rejected. An analysis of the post-test scores when compared by division, did not

show any significant difference (at the .01 level) in the responses. The faculty members of each division, rated their departments at substantially the same level of meeting the standards for excellence.

It should be noted that if the .05 level of significance were used this null hypothesis could be rejected. The health and human services division had the most favorable post-test responses with a total mean of 68.97 (per question mean 1.41). The division with the least favorable responses was the business division with a total mean of 83.73 (per question mean 1.71). All five divisions rated themselves more favorably than just meeting the standards for excellence (1.00 = exceeding the standards, 2.00 = meeting the standards, 3.00 = below the standards).

An itemized analysis was also done by division. The responses to only ten of the forty-nine survey questions studied, indicated a significant difference in the way the divisions viewed themselves. Eight out of these ten questions were items that did not show a significant change in responses from pre-test to post-test.

The first two of these questions that showed divisional differences were in the instructional staff section of the survey (questions 8 and 10). The first of these two questions was concerned with the faculty members maintaining

active membership in professional organizations. The trades and industry division had the most favorable responses (mean 1.48) while the special services/general education division had the least favorable responses (mean 2.05).

In considering the results of this question, it seemed appropriate that the trades and industry division would be most active in professional organizations since that would be the most likely way to keep up with new trends in industry. In the general education area, while professional organizations would certainly be relevant, they would not be as critical as in the trades area where technology is constantly changing.

The other question that showed a difference in divisional responses (question 10) was related to following a written plan for professional development. This time the health and human services division had the most favorable responses (mean = 1.59) while the business education division had the least favorable responses (mean = 2.16). The business education division saw room for improvement in meeting the standards for professional development plans. This may be an area where some divisions have done more work than others.

The next two items that showed divisional differences were found in the competencies area of the curriculum

section (questions 22 and 29). The health and human services division saw their departments' curriculum providing opportunities for students to develop competencies and understandings related to professional positions significantly more than did the trades and industry division. The health and human services division had the most favorable responses (mean = 1.28) while the trades and industry division had the least favorable responses (mean = 1.74). All divisions however, from the teachers' perspectives, were exceeding the standards for excellence.

The health and human services division also had the most favorable responses regarding the curriculum's provision for development of skills and knowledge related to work ethics (mean = 1.32). This seemed to go along with the humanistic nature of that division. The business education and special services/general education divisions came in least favorably (means = 1.77). Although once again, all division rated themselves as better than just meeting the standard for excellence in this area.

The remainder of the questions that showed differences in responses on the post-test by division, were in the section about instruction (questions 35, 43, 45, 46, 47, and 49). The first of these was related to content (question 35). The average response to this question was 1.49 which

was below the post-test average per question of 1.62. The health and human services division had the most favorable responses (mean = 1.14). This question was related to the specification of the sequence of instructional activities in the course guides.

It may be due to the use of the WisCom system for curriculum, where activities were sequenced in a computerized format, that the responses to this question were more favorable than many. Since the health and human services division still had significantly lower responses, it would appear that they organized their instructional activities more sequentially that other divisions. This may be illustrative of the relative importance of following a proper sequence of activities in the health area as opposed to the business education division where activities are generally not affecting life or health.

The other questions with significant divisional differences in the instruction part of the survey, were related to the accommodation of individual learning styles of students through the use of; demonstrations, field trips, hands-on learning, field experiences, and oral presentations. On the question related to demonstrations (question 43), the health and human services division again had the most favorable responses (mean = 1.25). Since it would be

important to use demonstrations in nursing and other health related areas, it was not surprising to get that result. The least favorable responses came from the special services/general education area (mean = 1.70) which also seemed appropriate since demonstrations of mathematics or reading for example, would not be as critical as demonstrations in the nursing areas. All divisions however, showed responses that were more favorable than just meeting the standards for excellence.

The use of field trips (question 45) was rated most favorably by the agriculture/home and consumer science division (mean = 1.42). Since the participation in field trips was an integral part of the curriculum of the agriculture section of that division, this response seemed appropriate. The special services/general education division produced the least favorable responses (mean = 2.25). Their responses were below the category of meeting of standards. This division however, would not find much use for field trips unlike the areas in the agriculture area so this would not necessarily be an area in need of improvement.

The question about hands-on learning (question 46) would seem to have considerable importance for the health and human services. This was illustrated by the division's favorable responses (mean = 1.31). The special services/gen-

eral education division showed the least favorable responses (mean = 2.24) which also seemed appropriate since there would not be as many relevant hands-on learning activities in the general education area as in the health and human services area.

The question related to field experiences (question 47) had a particulary unfavorable response by the special services/general education division. This however was appropriate, since there would not be relevant internship activities in the special education area. Students in general education classes may feed into internship programs offered by other divisions. The low response was from the health and human services division (mean = 1.33) in which internship and field experiences would be appropriate activities.

The last question to show divisional differences involved the use of oral presentations as an instructional activity (question 49). What might be considered the most people-oriented division, health and human services, recorded the most favorable responses (mean = 1.22). The least favorable responses were still better than the middle category of meeting the standards. These responses were generated by the trades and industry division (mean = 1.77).

To summarize, although there were no general signifi-

cant differences in responses by the divisions, the responses some individual questions indicated significant differences. Of those questions, only four seemed to indicate a need for further study. There was an indication that some divisions followed professional development plans more than others (question 10), with two divisions responding just at, or below the meeting of the standards level. The other three questions (questions 22, 29, and 49), although they all drew responses more favorable than meeting the standards for excellence, they showed divisional differences that might warrant further study. The reason why some divisions were rated higher than others, might produce ideas for improvement for the appropriate divisions.

When comparing divisions by their total pre-test and post-test scores, it was found that only one division showed a significant difference at the .01 level. The health and human services division was the area that showed the most significant improvement as indicated by its responses to the survey. At the .05 level, the special services/general education and trades and industry divisions could be said to show favorable differences in responses. The seemingly least effected by the QIE training were the agriculture/home and consumer science and business education divisions, since they did not show a significant difference in their pre-test

and post-test results. Therefore, although the analysis of the data for the first hypothesis indicated a significant difference in responses overall, the analysis of the data by division indicated that the significant changes did not appear in all divisions.

Hypothesis Three

The third hypothesis that this study addressed was that there was no difference in the quality of instruction by male instructors who took the QIE training program compared with female instructors who took the QIE training program. A comparison of the responses to the post-test by males and by females, lead to the conclusion that this null hypothesis could not be rejected. There was no significant difference in how men responded to the post-test survey when compared with how women responded to it.

A comparison of the pre-test and post-test scores of the surveys completed by males indicated a significant difference only at the .05 level ($t = .013$) while the same comparison done on surveys completed by females indicated a significant difference at the .01 level ($t = .007$). The male respondents improved their total scores by 7.6 points (from 87.57 to 79.97) while the female respondents improved their total scores by 8.0 points (from 86.08 to 78.08). The indication was that both groups rated their departments more

favorably when they took the post-test than when they took the pre-test.

Hypothesis Four

The fourth hypothesis considered in this study was that there was no difference in the quality of instruction among the groups of; those taking the pre-test and training, those taking the pre-test but not the training, and those not taking the pre-test but taking the training. When these three treatment groups were compared, it was found that there was no significant difference in their responses to the post-test. The fourth null hypothesis could not therefore be rejected.

Although the two treatment groups that took the QIE training had the most favorable total mean scores (79.83 for the group that took QIE and the pre-test, 80.98 for the group that took QIE but did not take the pre-test), they did not differ enough from the mean score of the group that did not take the QIE training (86.47) to make a statistical difference. Nor did the taking of the pre-test appear to affect the faculty's responses to the post-test. None of the three groups varied significantly in their responses to the post-test.

This data may indicate that a difference in responses from the pre-test to the post-test would have occurred even

if QIE training had not taken place. It could mean that the faculty members viewed their departments more favorably at the end of the school year than at the beginning of it regardless of what training took place during the year. It does not however, rule out the possibility that the QIE training did make a difference in the quality of instruction.

If the QIE training had caused the favorable difference in scores, it should be shown why all three groups improved, and not just the ones that completed QIE. One reason could be that the quality program at FVTC did just what it was intended to do. The intent of the program was to have the quality concepts infiltrate the organization and become the culture of the organization (Spanbauer, 1987).

The faculty of FVTC was aware that a quality process was being instituted at the school. There was one group of faculty members that went through the QIE training class in the summer of 1987. The first day of the fall block of 1987 consisted of an in-service program. The QIE classes were discussed briefly and the pre-test was administered to the faculty members that had not already taken it in the summer.

An awareness of the quality program was therefore present and this awareness increased as more people took part in the quality classes. One module of the QIE class consisted of the presentation of projects that were to be done by

groups of members of each class. The projects were to be related to the quality process at FVTC. In the process of completing these projects, it was likely that contact was at times made with faculty members not yet taking the QIE training. For example, if a departmental survey was conducted to gather data for a project, all department members were contacted. A general recognition of the quality process was present in the school before everyone had yet completed the QIE training.

This recognition of the process was not necessarily a positive one. The attitudes varied, but the awareness of the process was there. This general awareness, made it impossible to isolate the treatment groups so the experiences of one of the groups would not affect the others. Each of the groups, therefore, as the year went on, had received some information about QIE from other groups.

This loss of maximized between-groups variance might explain why all three treatment groups seemed to benefit equally from the program whether they took the QIE class or not, and whether they took the pre-test or not. This could mean that QIE did actually help produce the positive results on the quality of instruction.

The alternative situation would be that QIE had nothing to do with the improvement in the post-test scores.

Some other factors may have affected the post-test results. The results might have been more favorable at the end of the school year than at the beginning of the school year, just because the faculty was looking forward to the summer, making the general school climate positive at that time. If this was the case, then all of the groups would have shown the similar favorable responses that they did.

A survey was administered shortly before this study's survey, to assess the school's climate. That survey was a part of a study being done by G. Pursell (personal communication, June 17, 1988) to assess changes in the school's climate. Each faculty member was to rate each item regarding school climate on a scale of one to five where five was the most favorable response. Although the analysis of the results were not yet completed at the time of this study, the mean responses were available.

The means of the responses to the thirty-four items on the climate survey ranged from 2.27 to 4.18. Twenty of the thirty-four mean responses fell in the mid range of 2.5 to 3.5. There were no responses at the low range of 1.00 to 2.26 or at the high range of 4.19 to 5.00. These responses indicated that the climate was not strongly positive (or negative) at the time that the quality post-test was given.

The data from Pursell's climate study may be an

indication that the change in responses found in the present study were not due to a positive climate found at the end of the school year. The favorable response may have been due to the quality process that infiltrated the school's culture throughout the year. This positive effect was seen equally in males and females, across all five divisions, and regardless of the amount of time that lapsed after QIE training took place.

Hypothesis Five

The last hypothesis to be considered in this study was that there was no difference in the quality of instruction by those completing the training ten months previous to taking the post-test, compared with those completing the training eight months previous to taking the post-test, compared with those completing the training five months previous to taking the post-test, compared with those completing the training one month previous to taking the post-test. When the responses to the post-test of each of these four groups were compared, no significant difference was found. The fifth null hypothesis therefore, was not rejected.

Although the mean responses to the post-test became more favorable to meeting or exceeding the standards as the time lapse between QIE training and the post-test increased,

the responses did not differ enough to be considered statistically different. Although it might be expected that as more time elapsed after taking the QIE class, the more improvements could be made in a department, the responses did not indicate this. The time element did not make a difference in the post-test responses.

Similar to the results found in analyzing hypothesis four, the results here may imply that all groups were affected in some way by the quality program that was taking place at FVTC. The concept of the quality training was that it should be a holistic program. It should become part of the institution's culture and its effects should be seen in all aspects of the educational process. If in fact, this is what occurred, the treatment groups would not have been disjoint. The between-groups variance would not have been maximized because of the carry over from group to group regarding the quality process. Discussions about the quality process filtered across groups. This could have caused the responses of all the groups to become similar, as happened in this study.

Summary

The analysis of the data in this study brought mixed results. The only null hypothesis that was rejected was the first one. There was a significant difference in pre-test

and post-test responses, indicating a favorable change of responses for meeting or exceeding standards for excellence after QIE training took place.

The other four hypotheses could not be rejected. There was no difference in responses seen across divisions or sex. More surprising to the investigator was that there was no statistically significant difference in responses across groups representing those that took the pre-test and QIE, took the pre-test but not QIE, and did not take the pre-test but did take QIE.

In addition, no difference could be found between responses of the groups that were formed by the amount of time that lapsed between taking QIE training and taking the post-test. It did not appear to make a difference if one group had more time to institute changes after taking QIE class than another group. All responses in general became more favorable at the end of the school year after the quality process was instituted in the organization.

Possible conclusions that can be made from this analysis are presented in the following chapter. Recommendations that come from the information and analysis that was done in this study are also offered, along with recommendations for further study.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this study was to determine whether a training program developed to improve the quality of business and industry could be used in a school situation to improve the quality of instruction in education. Crosby's fourteen point model for achieving excellence was followed and incorporated into a staff-development program at Fox Valley Technical College (FVTC).

The faculty of FVTC (approximately 240) took part in quality instructor education classes (QIE) throughout the 1987-88 school year. A survey instrument to measure the quality of instruction was administered at the beginning and again, at the end of the school year. An analysis was done to determine if there was a change in the quality of instruction.

Conclusions from this Study

The first hypothesis presented in this study was that the training program had no effect on the quality of instruction by the faculty. This hypothesis was rejected. It was

found in this study that there was a difference in pre-test and post-test scores and therefore it appeared that the training program had an effect on the quality of instruction. Quality of instruction as measured by the standards for excellence used in the survey instrument (see Appendix B), had improved. However, before a conclusion could be drawn regarding the cause of the improved scores, the next four hypotheses were considered.

The second hypothesis was that there was no difference across divisions in the quality of instruction by faculty after taking the training program. This hypothesis was not rejected since there were no significant differences in how the divisions responded to the survey. There were five divisions at FVTC; Agriculture/Home and Consumer Science, Business Education, Special Services/General Education, Health and Human Services, and Trades and Industry. Each of these divisions when compared to each other, were at the same level of excellence as measured by the standards for excellence. No division significantly exceeded or fell below, the ratings of the other divisions at the end of the school year. The training did not appear to affect one division more than another.

The third hypothesis was that there was no difference in the quality of instruction by male instructors who took

the training program compared with female instructors who took the training program. This hypothesis was not rejected. There was no difference found in how males responded to the post-test when compared with how females responded to the post-test. It appeared that the quality of instruction by males and was similar to the quality of instruction by females following the quality training.

The fourth hypothesis stated that there was no difference in the quality of instruction among the groups of; those taking the pre-test and training, those taking the pre-test but not the training, and those not taking the pre-test but taking the training. This hypothesis was not rejected since there was no significant difference in the responses by the three treatment groups. At the end of the school year, the quality of instruction (as measured by the standards for excellence) by the group that took the training was at the same level as that of the group that did not take the training. Similarly, the group that took the pre-test did as well as those that did not take the pre-test. Since all of these groups when compared with each other, were at the same level of excellence, it appeared that something other than the quality training caused the improvement.

Improvement in scores may have been due to the overall influence that the quality program had on the culture

of FVTC. The purpose of the program was to infiltrate the entire school with quality concepts and ideas. This goal may have been met, which would have made all groups similar whether they took the 20-hour quality class or not. Quality concepts were discussed throughout the college.

The time of the school year may have been a factor in the overall improvement. Staff may have been more positive at the end of the school year when they took the post-test than at the beginning of the school year when they took the pre-test. However, since a climate study done at the end of the school year indicated that there was not a strongly positive climate at FVTC at that time, this may not have been a factor in the improved scores.

Improvement may also have been evidence of the Hawthorne effect. Faculty may have indicated improved quality in the departments because of general awareness that a quality porgram was taking place, regardless of its content. It appeared likely however, since quality concepts were being discussed throughout FVTC, that these concepts became part of the school's culture, as they were intended. This would have caused each of the treatment groups to become similar to each other, which could explain the similar responses by all groups to the post-test survey.

The fifth hypothesis stated that <u>there was no</u>

difference in the quality of instruction by those completing the training ten months previous to taking the post-test, compared with those completing the training eight months previous to taking the post-test, compared with those completing the training five months previous to taking the post-test, compared with those completing the training one month previous to taking the post-test. This hypothesis was not rejected. There was no significant difference in the responses by the four treatment groups described in this hypothesis. Each of these four treatment groups showed the same level of excellence of instruction (as measured by the standards for excellence) at the end of the school year when compared with each other. There was no indication therefore, that the more time that lapsed after training, the more quality concepts would be applied by the faculty. The faculty improved overall regardless of the amount of time that lapsed after the training class.

The indication could be that improvement would be seen regardless of the training. It could instead, be an indication that the quality program affected the entire faculty regardless of the treatment group because of its holistic purpose as discussed in the analysis of the fourth hypothesis. It seemed likely, because of the goal of the quality program to permeate the entire system, that the

latter was true. This would explain why the responses of each of the groups were similar.

Although the first hypothesis was rejected, the analysis of the fourth and fifth hypothesis led to conflicting conclusions. If the QIE training had made a positive effect on the quality of instruction, then the groups taking QIE should have shown more favorable results than the groups that did not take QIE. However, all groups showed similar results in their responses. This could indicate either that the training did not cause the improved scores or that the training did have a positive effect but that the intended sharing of information about the quality process at FVTC between treatment groups caused the groups to have similar responses to the post-test questions.

Recommendations for Further Study

Since this study was done at one institution and since there was little between-groups variance, further work should be done using another institution as a comparison. The pre-test and post-test could be administered to the faculty at the second institution without introducing quality concepts or quality training. If no significant change in responses were found, it would lend support to the conclusion that QIE did make a difference at FVTC regardless of the treatment group being measured. If a significant favorable

change was seen in the responses at that second sample school, further evidence would be needed to conclude that QIE training improved quality of instruction.

A followup of this study could be done by repeating the post-test in the spring of 1989. The results should be compared to the 1988 results. Since the quality process should be on-going, the results should be similar or better. If the results were less favorable, it would indicate that either the 1988 results were not reliable, or the quality concepts were not maintained.

Recommendations

Since much time and money has been spent by experts in the field of education and in industry, on the achievement of excellence in organizations, it would seem beneficial to both areas to share information and ideas. This study has taken one program that has been used in industry and applied it to an educational institution. Although the results were mixed, this study has shown that there is potential for successful team efforts between individuals in the two fields.

An educational institution considering the development of an in-service program should use industrial resources as well as educational ones. FVTC adopted a nationally used program for improving the quality of an organization. Other

programs used by local business might be applicable to various school situations. These programs could offer information about new technology or human relations. Similary, business organizations should use educational resources when planning training programs or seminars for their employees. Information about instructional methods, learning styles and curriculum could be helpful in a business setting.

It is hoped that this study will encourage individuals in both education and industry to combine efforts in order to reach the common goal of excellence in organizations. It should not matter if the organization is in education or in business and industry. Improvement in either area would improve both areas.

Summary

It appeared that the QIE process did have a favorable effect on the quality of instruction at FVTC. The overall responses to the survey given after QIE training took place, were significantly more favorable than the responses to the same survey given before QIE training took place. However, because of the overall improvement regardless of treatment group being measured, further study needs to be done to make a positive conclusion.

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APPENDIX A

T-TEST COMPARISON OF PRE-TEST TOTALS AND POST-TEST TOTALS

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	168	86.62	3.59	366.58	0.000
Post-test	202	79.15			

T-TEST COMPARISON OF PRE-TEST AND POST-TEST BY QUESTION

Question	Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
4	Pre-test	168	1.69	2.57	358.87	0.010
	Post-test	198	1.53			
5	Pre-test	167	1.69	1.65	356.11	0.099
	Post-test	200	1.59			
6	Pre-test	167	1.75	2.37	347.76	0.018
	Post-test	200	1.60			
7	Pre-test	168	1.82	3.07	353.47	0.002
	Post-test	199	1.63			
8	Pre-test	168	2.04	4.32	357.81	0.000
	Post-test	197	1.74			
9	Pre-test	168	1.93	2.21	343.76	0.028
	Post-test	197	1.77			
10	Pre-test	168	2.15	4.08	350.44	0.000
	Post-test	197	1.87			
11	Pre-test	167	1.85	2.08	346.40	0.038
	Post-test	199	1.71			
12	Pre-test	163	2.23	1.68	355.35	0.095
	Post-test	198	2.11			
13	Pre-test	167	1.92	2.52	352.67	0.012
	Post-test	199	1.74			

T-TEST COMPARISON OF PRE-TEST AND POST-TEST BY QUESTION

Question	Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
14	Pre-test	168	2.18	3.30	352.96	0.001
	Post-test	200	1.92			
15	Pre-test	168	1.48	0.45	354.12	0.653
	Post-test	200	1.46			
16	Pre-test	168	1.98	2.73	359.10	0.007
	Post-test	200	1.78			
17	Pre-test	168	1.55	-0.52	356.83	0.601
	Post-test	200	1.58			
18	Pre-test	168	1.70	2.87	337.04	0.004
	Post-test	197	1.51			
19	Pre-test	165	1.53	2.23	339.06	0.027
	Post-test	199	1.40			
20	Pre-test	166	1.80	3.35	332.86	0.001
	Post-test	200	1.57			
21	Pre-test	168	1.54	0.91	359.09	0.366
	Post-test	200	1.49			
22	Pre-test	161	1.69	1.38	340.14	0.168
	Post-test	199	1.60			
23	Pre-test	162	1.83	2.16	329.46	0.031
	Post-test	197	1.67			

T-TEST COMPARISON OF PRE-TEST AND POST-TEST BY QUESTION

Question	Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
24	Pre-test	165	1.64	1.44	334.46	0.151
	Post-test	198	1.55			
25	Pre-test	167	1.76	2.28	353.15	0.023
	Post-test	198	1.61			
26	Pre-test	162	1.93	2.72	336.57	0.007
	Post-test	199	1.72			
27	Pre-test	165	1.81	2.05	349.71	0.041
	Post-test	198	1.67			
28	Pre-test	166	1.87	2.28	351.58	0.023
	Post-test	196	1.71			
29	Pre-test	168	1.77	2.30	348.10	0.022
	Post-test	198	1.61			
30	Pre-test	168	1.66	1.38	348.99	0.169
	Post-test	196	1.56			
31	Pre-test	166	1.77	1.71	352.97	0.088
	Post-test	197	1.65			
32	Pre-test	167	1.58	0.82	341.22	0.412
	Post-test	192	1.53			
33	Pre-test	165	1.47	0.77	334.88	0.445
	Post-test	199	1.43			

T-TEST COMPARISON OF PRE-TEST AND POST-TEST BY QUESTION

Question	Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
34	Pre-test	167	1.60	1.18	341.92	0.239
	Post-test	193	1.52			
35	Pre-test	166	1.54	0.87	340.74	0.386
	Post-test	193	1.49			
36	Pre-test	167	1.87	3.22	329.21	0.001
	Post-test	191	1.64			
37	Pre-test	167	1.57	0.86	350.44	0.392
	Post-test	192	1.52			
38	Pre-test	159	2.06	3.13	317.41	0.002
	Post-test	190	1.82			
39	Pre-test	162	1.83	1.08	336.77	0.279
	Post-test	191	1.75			
40	Pre-test	159	1.95	1.80	335.71	0.073
	Post-test	191	1.81			
41	Pre-test	164	1.84	1.69	341.01	0.092
	Post-test	193	1.72			
42	Pre-test	160	2.11	2.40	338.95	0.017
	Post-test	193	1.93			
43	Pre-test	164	1.63	1.28	325.11	0.202
	Post-test	193	1.55			

T-TEST COMPARISON OF PRE-TEST AND POST-TEST BY QUESTION

Question	Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
44	Pre-test	162	1.99	2.94	327.75	0.004
	Post-test	192	1.77			
45	Pre-test	162	2.09	1.29	334.67	0.199
	Post-test	188	1.98			
46	Pre-test	165	1.42	-1.64	342.55	0.101
	Post-test	188	1.52			
47	Pre-test	160	1.91	1.37	324.41	0.173
	Post-test	187	1.79			
48	Pre-test	164	1.49	0.05	338.41	0.958
	Post-test	192	1.48			
49	Pre-test	163	1.70	1.57	329.05	0.118
	Post-test	192	1.59			
50	Pre-test	166	1.58	-0.09	339.72	0.932
	Post-test	190	1.58			
51	Pre-test	157	2.14	1.72	319.16	0.087
	Post-test	185	1.99			
52	Pre-test	147	2.51	4.12	321.01	0.000
	Post-test	191	2.19			

ANOVA OF POST-TEST SCORES BY DIVISION

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4958.489	1239.622	2.510	.043
Within groups	189	93355.511	493.945		
Total	193	98314.000			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	75.83
Business Education	40	83.73
Special Services/General Education	61	82.72
Health & Human Services	29	68.97
Trades & Industry	40	77.78
Total	194	79.00

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 4

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.079	.520	1.352	.252
Within groups	187	71.874	.384		
Total	191	73.953			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.42
Business Education	40	1.53
Special Services/General Education	61	1.64
Health & Human Services	27	1.33
Trades & Industry	40	1.50
Total	192	1.52

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 5

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	1.845	.461	1.327	.261
Within groups	187	64.983	.348		
Total	191	66.828			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.63
Business Education	40	1.43
Special Services/General Education	60	1.68
Health & Human Services	28	1.50
Trades & Industry	40	1.60
Total	192	1.58

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 6

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	.824	.206	.511	.728
Within groups	188	75.839	.403		
Total	192	76.663			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.54
Business Education	40	1.50
Special Services/General Education	60	1.67
Health & Human Services	29	1.55
Trades & Industry	40	1.63
Total	193	1.59

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 7

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.310	.577	1.724	.146
Within groups	186	62.300	.335		
Total	190	64.607			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.52
Business Education	40	1.58
Special Services/General Education	61	1.79
Health & Human Services	28	1.54
Trades & Industry	39	1.56
Total	191	1.63

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 8

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	11.765	2.941	7.248	.000
Within groups	185	75.077	.406		
Total	189	86.842			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.63
Business Education	40	1.83
Special Services/General Education	58	2.05
Health & Human Services	28	1.43
Trades & Industry	40	1.48
Total	190	1.74

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 9

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.121	1.280	3.033	.019
Within groups	184	77.683	.422		
Total	188	82.804			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.50
Business Education	39	1.92
Special Services/General Education	59	1.90
Health & Human Services	28	1.57
Trades & Industry	39	1.67
Total	189	1.76

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 10

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	9.063	2.266	5.949	.000
Within groups	184	70.080	.381		
Total	188	79.143			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.65
Business Education	38	2.16
Special Services/General Education	59	2.00
Health & Human Services	29	1.59
Trades & Industry	40	1.68
Total	189	1.86

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 11

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.613	.653	1.647	.164
Within groups	186	73.775	.397		
Total	190	76.387			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.63
Business Education	39	1.79
Special Services/General Education	59	1.81
Health & Human Services	29	1.52
Trades & Industry	40	1.60
Total	191	1.70

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 12

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.453	1.113	1.787	.133
Within groups	186	115.851	.623		
Total	190	120.304			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.96
Business Education	39	2.36
Special Services/General Education	60	2.12
Health & Human Services	29	2.03
Trades & Industry	39	1.92
Total	191	2.09

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 13

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	3.980	.995	2.436	.049
Within groups	186	75.958	.408		
Total	190	79.937			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.67
Business Education	40	1.80
Special Services/General Education	60	1.88
Health & Human Services	29	1.45
Trades & Industry	38	1.76
Total	191	1.75

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 14

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.718	1.180	2.089	.084
Within groups	187	105.595	.565		
Total	191	110.313			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.83
Business Education	40	2.00
Special Services/General Education	60	2.08
Health & Human Services	29	1.69
Trades & Industry	40	1.75
Total	192	1.91

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 15

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.060	.515	1.621	.171
Within groups	187	59.419	.318		
Total	191	61.479			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.46
Business Education	40	1.48
Special Services/General Education	60	1.52
Health & Human Services	29	1.21
Trades & Industry	39	1.49
Total	192	1.45

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 16

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.484	1.121	2.161	.075
Within groups	187	97.011	.519		
Total	191	101.495			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.63
Business Education	39	1.74
Special Services/General Education	60	1.93
Health & Human Services	29	1.48
Trades & Industry	40	1.78
Total	192	1.76

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 17

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	.187	.047	.131	.971
Within groups	187	66.933	.358		
Total	191	67.120			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.58
Business Education	40	1.60
Special Services/General Education	60	1.58
Health & Human Services	29	1.55
Trades & Industry	39	1.51
Total	192	1.57

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 18

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.822	.706	1.955	.103
Within groups	184	66.395	.361		
Total	188	69.217			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.33
Business Education	40	1.60
Special Services/General Education	59	1.64
Health & Human Services	28	1.43
Trades & Industry	38	1.39
Total	189	1.51

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 19

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	1.343	.336	1.066	.375
Within groups	186	58.615	.315		
Total	190	59.958			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.35
Business Education	40	1.40
Special Services/General Education	60	1.52
Health & Human Services	28	1.29
Trades & Industry	40	1.35
Total	191	1.40

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 20

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	3.004	.751	2.182	.073
Within groups	187	64.366	.344		
Total	191	67.370			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.38
Business Education	40	1.73
Special Services/General Education	60	1.63
Health & Human Services	28	1.43
Trades & Industry	40	1.48
Total	192	1.56

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 21

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	3.387	.847	2.308	.060
Within groups	187	68.593	.367		
Total	191	71.979			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.42
Business Education	40	1.63
Special Services/General Education	60	1.53
Health & Human Services	29	1.21
Trades & Industry	39	1.54
Total	192	1.49

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 22

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.326	1.332	4.113	.003
Within groups	186	60.223	.324		
Total	190	65.550			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.46
Business Education	40	1.63
Special Services/General Education	59	1.73
Health & Human Services	29	1.28
Trades & Industry	39	1.74
Total	191	1.61

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 23

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	3.714	.928	2.093	.083
Within groups	185	82.055	.444		
Total	189	85.768			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.48
Business Education	40	1.50
Special Services/General Education	59	1.69
Health & Human Services	29	1.86
Trades & Industry	39	1.79
Total	190	1.67

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 24

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.533	.633	2.005	.096
Within groups	186	58.744	.316		
Total	190	61.278			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.54
Business Education	40	1.63
Special Services/General Education	59	1.63
Health & Human Services	28	1.29
Trades & Industry	40	1.55
Total	191	1.55

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 25

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.298	.575	1.500	.204
Within groups	186	71.252	.383		
Total	190	73.550			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.63
Business Education	40	1.70
Special Services/General Education	60	1.58
Health & Human Services	29	1.38
Trades & Industry	38	1.71
Total	191	1.61

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 26

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.627	1.157	2.388	.053
Within groups	186	90.106	.484		
Total	190	94.733			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.92
Business Education	40	1.53
Special Services/General Education	59	1.71
Health & Human Services	29	1.97
Trades & Industry	39	1.62
Total	191	1.72

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 27

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.656	1.164	2.945	.022
Within groups	185	73.113	.395		
Total	189	77.768			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.54
Business Education	40	1.90
Special Services/General Education	59	1.73
Health & Human Services	27	1.41
Trades & Industry	40	1.63
Total	190	1.67

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 28

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.307	1.327	2.947	.022
Within groups	184	82.831	.450		
Total	188	88.138			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.75
Business Education	40	1.85
Special Services/General Education	59	1.81
Health & Human Services	29	1.34
Trades & Industry	37	1.70
Total	189	1.72

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 29

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	6.313	1.579	4.353	.002
Within groups	185	67.081	.363		
Total	189	73.395			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.38
Business Education	39	1.77
Special Services/General Education	60	1.77
Health & Human Services	28	1.32
Trades & Industry	39	1.54
Total	190	1.61

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 30

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	3.616	.904	2.006	.096
Within groups	183	82.485	.451		
Total	187	86.101			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.63
Business Education	39	1.51
Special Services/General Education	59	1.61
Health & Human Services	28	1.29
Trades & Industry	38	1.74
Total	188	1.57

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 31

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.488	.622	1.350	.253
Within groups	184	84.761	.461		
Total	188	87.249			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.58
Business Education	39	1.72
Special Services/General Education	60	1.68
Health & Human Services	28	1.39
Trades & Industry	38	1.74
Total	189	1.65

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 32

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.218	1.054	2.966	.021
Within groups	179	63.646	.356		
Total	183	67.864			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.54
Business Education	38	1.58
Special Services/General Education	57	1.54
Health & Human Services	27	1.19
Trades & Industry	38	1.68
Total	184	1.53

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 33

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	3.250	.812	2.931	.022
Within groups	186	51.546	.277		
Total	190	54.796			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.42
Business Education	39	1.62
Special Services/General Education	60	1.40
Health & Human Services	28	1.18
Trades & Industry	40	1.48
Total	191	1.43

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 34

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.192	1.048	2.775	.029
Within groups	180	67.992	.378		
Total	184	72.184			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.50
Business Education	38	1.74
Special Services/General Education	58	1.52
Health & Human Services	27	1.22
Trades & Industry	38	1.53
Total	185	1.52

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 35

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.016	1.254	3.946	.004
Within groups	180	57.201	.318		
Total	184	62.216			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.50
Business Education	38	1.66
Special Services/General Education	57	1.46
Health & Human Services	28	1.14
Trades & Industry	38	1.61
Total	185	1.49

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 36

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	1.294	.323	.806	.523
Within groups	178	71.439	.401		
Total	182	72.732			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.65
Business Education	39	1.67
Special Services/General Education	58	1.67
Health & Human Services	26	1.42
Trades & Industry	37	1.65
Total	183	1.63

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 37

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	3.379	.845	2.495	.045
Within groups	179	60.615	.338		
Total	183	63.995			

Group	Count	Mean
Agriculture/Home & Consumer Science	22	1.59
Business Education	40	1.65
Special Services/General Education	58	1.52
Health & Human Services	28	1.21
Trades & Industry	36	1.50
Total	184	1.51

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 38

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.363	.591	1.438	.224
Within groups	178	73.156	.411		
Total	182	75.519			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.74
Business Education	37	1.97
Special Services/General Education	58	1.81
Health & Human Services	27	1.59
Trades & Industry	38	1.79
Total	183	1.80

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 39

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.061	1.015	2.377	.054
Within groups	179	76.440	.427		
Total	183	80.500			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.79
Business Education	39	1.85
Special Services/General Education	57	1.75
Health & Human Services	27	1.41
Trades & Industry	37	1.86
Total	184	1.75

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 40

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.052	1.263	2.401	.052
Within groups	178	93.636	.526		
Total	182	98.689			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.70
Business Education	38	1.92
Special Services/General Education	57	1.84
Health & Human Services	28	1.43
Trades & Industry	37	1.89
Total	183	1.79

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 41

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.599	1.400	3.204	.014
Within groups	180	78.639	.437		
Total	184	84.238			

Group	Count	Mean
Agriculture/Home & Consumer Science	22	1.55
Business Education	39	1.87
Special Services/General Education	57	1.79
Health & Human Services	28	1.36
Trades & Industry	39	1.77
Total	185	1.71

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 42

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	.863	.216	.439	.780
Within groups	181	88.927	.491		
Total	185	89.790			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.78
Business Education	39	2.00
Special Services/General Education	58	1.93
Health & Human Services	29	1.97
Trades & Industry	37	1.86
Total	186	1.92

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 43

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.1246	1.281	4.213	.003
Within groups	180	54.735	.304		
Total	184	59.860			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.43
Business Education	38	1.68
Special Services/General Education	57	1.70
Health & Human Services	28	1.25
Trades & Industry	39	1.46
Total	185	1.55

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 44

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	3.172	.793	1.804	.130
Within groups	179	78.692	.440		
Total	183	81.864			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.65
Business Education	37	1.97
Special Services/General Education	58	1.83
Health & Human Services	28	1.57
Trades & Industry	38	1.74
Total	184	1.78

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 45

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	14.761	3.690	7.285	.000
Within groups	176	89.151	.507		
Total	180	103.912			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.42
Business Education	38	2.18
Special Services/General Education	57	2.25
Health & Human Services	27	1.81
Trades & Industry	35	1.83
Total	181	1.98

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 46

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	6.979	1.745	5.676	.000
Within groups	176	54.104	.307		
Total	180	61.083			

Group	Count	Mean
Agriculture/Home & Consumer Science	22	1.36
Business Education	39	1.51
Special Services/General Education	59	1.80
Health & Human Services	26	1.31
Trades & Industry	35	1.37
Total	181	1.53

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 47

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	20.947	5.237	10.706	.000
Within groups	175	85.603	.489		
Total	179	106.550			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.42
Business Education	38	1.63
Special Services/General Education	55	2.24
Health & Human Services	27	1.33
Trades & Industry	36	1.83
Total	180	1.78

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 48

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	4.560	1.140	3.323	.012
Within groups	179	61.418	.343		
Total	183	65.978			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	1.52
Business Education	37	1.57
Special Services/General Education	60	1.55
Health & Human Services	27	1.11
Trades & Industry	37	1.57
Total	184	1.49

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 49

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	5.429	1.357	3.616	.007
Within groups	179	67.180	.375		
Total	183	72.609			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.50
Business Education	39	1.69
Special Services/General Education	59	1.61
Health & Human Services	27	1.22
Trades & Industry	35	1.77
Total	184	1.59

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 50

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	2.902	.725	1.906	.111
Within groups	177	67.362	.381		
Total	181	70.264			

Group	Count	Mean
Agriculture/Home & Consumer Science	24	1.54
Business Education	39	1.72
Special Services/General Education	58	1.64
Health & Human Services	26	1.31
Trades & Industry	35	1.57
Total	182	1.58

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 51

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	6.226	1.557	3.050	.019
Within groups	172	87.774	.510		
Total	176	94.000			

Group	Count	Mean
Agriculture/Home & Consumer Science	21	1.62
Business Education	37	2.16
Special Services/General Education	57	2.05
Health & Human Services	27	1.78
Trades & Industry	35	2.14
Total	177	2.00

ANOVA OF POST-TEST SCORES BY DIVISION-QUESTION 52

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	4	1.625	.406	.758	.554
Within groups	178	95.424	.536		
Total	182	97.049			

Group	Count	Mean
Agriculture/Home & Consumer Science	23	2.09
Business Education	39	2.33
Special Services/General Education	56	2.11
Health & Human Services	28	2.25
Trades & Industry	37	2.14
Total	183	2.18

T-TEST COMPARISON OF PRE-TEST AND POST-TEST DIVISION A

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	21	74.29	-0.28	42.94	0.782
Post-test	24	75.83			

T-TEST COMPARISON OF PRE-TEST AND POST-TEST DIVISION B

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	28	90.36	1.50	63.61	0.137
Post-test	40	83.73			

T-TEST COMPARISON OF PRE-TEST AND POST-TEST DIVISION C

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	47	90.28	2.00	105.90	0.048
Post-test	61	82.72			

TABLE-TEST COMPARISON OF PRE-TEST AND POST-TEST DIVISION D

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	29	82.62	2.75	54.56	0.008
Post-test	29	68.97			

T-TEST COMPARISON OF PRE-TEST AND POST-TEST DIVISION E

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	41	89.24	2.35	65.74	0.022
Post-test	40	77.78			

Division A = Agriculture/Home and Consumer Science
Division B = Business Education
Division C = Special Services/General Education
Division D = Health and Human Services
Division E = Trades and Industry

T-TEST COMPARISON OF POST-TEST BY SEX

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Males	103	79.97	0.59	192.53	0.556
Females	92	78.08			

T-TEST COMPARISON OF PRE-TEST & POST-TEST - MALES

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	90	87.57	2.52	184.62	0.013
Post-test	103	79.97			

T-TEST COMPARISON OF PRE-TEST & POST-TEST - FEMALES

Variable	Number of Cases	Mean	T Value	D.o.F.	2-Tail Prob.
Pre-test	72	86.08	2.72	161.42	0.007
Post-test	92	78.08			

ANOVA OF POST-TEST SCORES BY TREATMENT GROUPS

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	2	1163.855	581.928	1.343	.264
Within groups	190	82319.098	433.258		
Total	192	83482.953			

Group	Count	Mean
Took pre-test and QIE	150	79.83
Took pre-test but not QIE	32	86.47
Did not take pre-test did take QIE	11	80.98
Total	193	80.98

ANOVA OF POST-TEST SCORES BY TIME LAPSE

Source	D.o.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between groups	3	258.454	86.151	.162	.922
Within groups	171	91209.066	533.386		
Total	174	91467.520			

Group	Count	Mean
QIE 10 months previous to post-test	16	74.38
QIE 8 months previous to post-test	81	77.78
QIE 5 months previous to post-test	51	78.25
QIE 1 month previous to post-test	27	79.30
Total	175	77.84

APPENDIX B

FOX VALLEY TECHNICAL COLLEGE

Instructor Survey

1. Sex a. M _____

   b. F _____

2. Age _____

   a. 25 years old or less
   b. 26 years through 30 years
   c. 31 years through 35 years
   d. 36 years through 45 years
   e. 46 years or over

3. Division _____

   a. Agriculture/Home and Consumer Science
   b. Business Education
   c. Special Services/General Education
   d. Health and Human Services
   e. Trades and Industry

Directions:
Each section begins with a "Standard Statement." Read that standard statement. Then indicate how each statement that follows it compares to the given standard. Fill in the dot for the letter for "Exceeds Standard" (a) or "Meets Standard" (b), or for "Below Standard" (c) for each item. Relate each statement to your own department. Your department is defined as the program area which you teach. Please fill in the identifier code in the upper right-hand corner.

Substantially:
Exceeds Standard a
Meets Standard b
Below Standard c

INSTRUCTIONAL STAFF

Standard Statement

The instructional staff demonstrates professional and technical competence in providing services necessary for attaining program goals and objectives.

A. Qualifications

4. Each faculty member is qualified to teach the content of assigned courses. a b c

   Comment:

5. Each faculty member demonstrates acceptable written and oral communication skills. a b c

   Comment:

6. Each faculty member exhibits desirable human interaction skills. a b c

   Comment:

7. Each faculty member provides positive leadership in the classroom, school, community, and profession. a b c

   Comment:

B. Professionalism

8. Each faculty member maintains active membership in professional organizations in your department. a b c

   Comment:

9. Each faculty member attends professional meetings for their speciality each year. a b c

   Comment:

C. Staff Development

10. Each faculty member follows a written plan for professional development. a b c

Comment:

11. Each faculty member participates in staff development activities. a b c

Comment:

12. Staff development activities include an orientation program for new faculty. a b c

Comment:

D. Evaluation

13. Teachers evaluate the effectiveness of their instruction. a b c

Comment:

14. Evaluations of faculty are conducted regularly, based on established procedures that ensure equality of opportunity. a b c

Comment:

CURRICULUM AND INSTRUCTION

Standard Statement

Curriculum and instruction are designed to reflect current theory, methods, and business practices and to address the needs of the public served.

A. Curriculum

1. Planning

15. The curriculum reflects the stated philosophy and objectives of both your program and the school program. a b c

Comment:

16. Representative groups involved in the development and revision of the curriculum include administrative and supervisory personnel, advisory committees, department faculty, and students. a b c

Comment:

17. The curriculum includes provision to ensure that students achieve on the basis of competencies previously developed. a b c

Comment:

18. The curriculum is designed to develop student talent, creative ability, positive self-concept, and individual potential. a b c

Comment:

19. The curriculum is designed to meet evolving needs of the employment community. a b c

Comment:

20 The curriculum provides for articulation among levels of classes to ensure that students are permitted to progress on the basis of competencies developed. a b c

Comment:

2. Development

21. Course content is developed from course objectives and reflects approved curriculum guides and other professional resources. a b c

Comment:

3. Competencies

22. The curriculum provides opportunities for students to develop competencies and understandings related to **professional positions**. a b c

Comment:

23. The curriculum provides for development of skills and knowledge related to **basic business understanding**. a b c

Comment:

24. The curriculum provides for development of skills and knowledge related to **career awareness**. a b c

Comment:

25. The curriculum provides for development of skills and knowledge related to **communication**. a b c

Comment:

26. The curriculum provides for development of skills and knowledge related to **computer literacy**. a b c

Comment:

27. The curriculum provides for development of skills and knowledge related to **decision making**. a b c

Comment:

28. The curriculum provides for development of skills and knowledge related to **interpersonal behaviors**. a b c

Comment:

29. The curriculum provides for development of skills and knowledge related to work ethics. a b c

Comment:

B. Course Objectives

30. Current course objectives are written in measurable terms, are presented to students, and are kept on file. a b c

Comment:

31. Current course objectives are utilized by teachers and administrators for planning, implementing, and evaluating content and instructional methods. a b c

Comment:

C. Instruction

1. Content

32. Current course guides are used by teachers in each class. a b c

Comment:

33. Course guides outline major units of study. a b c

Comment:

34. Course guides specify competencies to be acquired. a b c

Comment:

35. Course guides specify the sequence of instructional activities. a b c

Comment:

36. Course guides specify estimated time requirements for completing major units of study. a b c

Comment:

37. Course guides specify instructional materials needed for completing major units of study. a b c

Comment:

38. Course guides specify community resources needed for completing major units of study. a b c

Comment:

39. Course guides specify a variety of evaluation methods based on stated competencies. a b c

Comment:

40. Written lesson plans are available and used. a b c

Comment:

2. Activities

41. Individual learning styles of students are accommodated through the use of a variety of courseware. a b c

Comment:

42. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including data communications. a b c

Comment:

43. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **demonstrations**. a b c

Comment:

44. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **discovery learning**. a b c

Comment:

45. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **field trips**. a b c

Comment:

46. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **hands-on learning**. a b c

Comment:

47. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **internships or related field experiences**. a b c

Comment:

48. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **lecture/discussion**. a b c

Comment:

49. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **oral presentations.** a b c

Comment:

50. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **problem solving.** a b c

Comment:

51. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **speakers.** a b c

Comment:

52. Individual learning styles of students are accommodated through the use of a variety of instructional activities and resources including **telecommunication.** a b c

Comment:

---

53. Did you fill in this survey once before? a) yes b) no

54. Did you take the quality training class? a) yes b) no

55. If yes, when did you take it?
a) summer
b) fall
c) winter
d) spring

APPENDIX C

INTRODUCTION

Quality Instructor Education (QIE) is one of several competency-based courses designed to introduce staff members to quality concepts currently being applied in the business community and to the quality improvement process at Fox Valley Technical College.

As part of a comprehensive program to inform employees of this process, administrators, managers, support staff and board members have received training. QIE provides that training for the instructional staff at FVTC.

After quality concepts have been explored and the quality improvement process at FVTC has been detailed, instructors are given an opportunity to begin to apply these principles to their varied roles within the institution. Through a carefully designed sequence of materials and activities, the course provides a forum for instructors to explore the subject of quality in an educational setting, challenge traditional notions of quality and performance, and develop a personal plan of action.

NOTICE OF COPYRIGHT

This Curriculum Is Bias Free.

QUALITY INSTRUCTOR EDUCATION
Module 1 What is Quality?
09/22/87

MODULE OVERVIEW

Task

You will develop an awareness of the concepts of QUALITY and their application in a QUALITY IMPROVEMENT PROCESS.

Estimated Time

Two hours

Ask Yourself

1. Why is the quality of goods and services such a relevant topic in the USA today?
2. What do the major theorists in quality improvement say has to be done in order to provide quality service and products?

Outline

1. The Definition of Quality
2. Quality Concepts and Theories
3. Quality Improvement Process
4. Service and Product Industries

Learning Objectives

This module will prepare you to:

1. Write a definition of quality.
2. List the four elements of quality common to those theories discussed in class.

QUALITY INSTRUCTOR EDUCATION
Module 2 Quality Improvement at FVTC
09/08/87

MODULE OVERVIEW

Task

You will develop an understanding of Fox Valley Technical College's quality improvement process.

Estimated Time

Two hours

Ask Yourself

1. Why is FVTC, an educational institution, getting involved in quality?
2. What does the Crosby model have to offer?
3. How will we make this process work?

Outline

1. How It Began
2. The Crosby Model
3. The FVTC Quality Improvement Process
4. Measuring Progress

Learning Objective

This model will prepare you to rank FVTC on the "Maturity Grid."

QUALITY INSTRUCTOR EDUCATION
Module 3 Why Do We Need It?
09/08/87

MODULE OVERVIEW

Task

You will understand the benefits of a quality improvement process as well as the effects of the institutional climate on its success.

Estimated Time

Two hours

Ask Yourself

1. Do we all contribute to the climate at FVTC?
2. How important is "trust" among employees to the productivity and success of FVTC?
3. What are the benefits of a QUALITY IMPROVEMENT PROCESS to all customers at FVTC?

Outline

1. Quality Challenges
2. Institutional Climate
3. What's In It For Me?

Learning Objective

This module will prepare you to state the benefits to be derived from a QUALITY IMPROVEMENT PROCESS.

QUALITY INSTRUCTOR EDUCATION
Module 7 Roles of Others
09/09/87

MODULE OVERVIEW

Task

You will develop an awareness of the similarities and differences of roles in the quality improvement process.

Estimated Time

Two hours

Ask Yourself

1. What will everyone else be doing during the quality improvement process at FVTC?
2. What changes will I see in people?
3. What is my role compared to the roles of others?

Outline

1. Define "Others"
2. Special Roles
3. Common Roles

Learning Objective

This module will prepare you to design a model depicting the unique role of the instructor in the quality improvement process at FVTC.

QUALITY INSTRUCTOR EDUCATION
Module 4 Conformance to Requirements
08/10/87

MODULE OVERVIEW

Task

You will explore the necessity of establishing valid requirements in various instructor relationships.

Estimated Time

Four hours

Ask Yourself

1. What does a "requirement" look like?
2. When and how are requirements determined?
3. If requirements are supposed to be customer-based, then who's the customer?

Outline

1. Definition of Quality
2. The Relationships Model
3. Requirements in Relationships
4. Establishing Clear and Valid Requirements

Learning Objective

This module will prepare you to state the requirements for a particular task.

QUALITY INSTRUCTOR EDUCATION
Module 5 Prevention
08/07/87

MODULE OVERVIEW

Task	You will understand prevention.
Estimated Time	Two hours
Ask Yourself	Are you in the prevent-it mode or the fix-it mode?
Outline	1. Prevention Defined 2. Prevention vs. Fixing 3. Elements of Prevention 4. Customer Education 5. Instructional Applications
Learning Objective	This module will prepare you to write a checklist for instructors to ensure that they are in the prevention mode.

QUALITY INSTRUCTOR EDUCATION
Module 6 Zero Defects/PONC
09/22/87

MODULE OVERVIEW

Task

You will understand zero defects and the price of nonconformance

Estimated Time

Two hours

Ask Yourself

1. Is "that's good enough" a standard you accept as a customer or do you accept only zero defects?
2. Do you think quality costs money?

Outline

1. Defining Zero Defects
2. Identifying Costs of Quality
3. Using Price of Nonconformance (PONC)
4. Benefits of Reducing Costs of Quality (COQ)

Learning Objectives

This module will prepare you to:

1. Define zero defects as a performance standard as it relates to the relationship model.
2. Estimate the price of nonconformance.

QUALITY INSTRUCTOR EDUCATION
Module 8 Working Together
08/07/87

MODULE OVERVIEW

Task

You will determine the role of teams in the quality improvement process and the role of the individual as a team member.

Estimated Time

Two hours

Ask Yourself

Are you a good team member?

Outline

1. The Advantages of Teams
2. The Purposes of Teams
3. The Characteristics of Successful Teams
4. The Responsibilities of Individual Team Members

Learning Objectives

This module will prepare you to:

1. Identify two areas in which you can improve to become a more effective team member.
2. Describe a strategy for improving the two areas identified above.

QUALITY INSTRUCTOR EDUCATION
Module 9 Your Turn
09/09/87

MODULE OVERVIEW

Task

You will use your basic knowledge of quality concepts and processes to contribute new ideas and fresh perspective to the process at FVTC.

Estimated Time

2 hours

Ask Yourself

1. How can my unique talents and perspective enhance this process?
2. What do I do now?

Outline

1. Presentation of Group Projects
2. Is There Life After QIE?

Learning Objective

The preceding modules have prepared you to select or develop a topic related to the quality improvement process at FVTC. Working with a team you will explore and develop a topic for presentation in 10 minutes to the QIE class. All team members will be involved in the presentation.

APPROVAL SHEET

The dissertation submitted by Lucille A. Phillip has been read and approved by the following committee:

Dr. Mav Q. Bailey, Director
Associate Professor, Educational Leadership and Policy Studies, Loyola

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

8-8-88
Date

Mav Q Bailey
Director's Signature