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THE EFFECTIVENESS OF INVENTORY MANAGEMENT AND PRODUCTION SCHEDULING TRAINING IN A TOTAL QUALITY MANAGEMENT ENVIRONMENT

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ABSTRACT

In order for the United States economy to revitalize and survive in an intensively competitive international society it has become imperative that the total quality management (TQM) philosophy be adopted and fully implemented. One of the major tenets of this philosophy is personnel training. This study examined the impact of various types of inventory management and production scheduling training in a large manufacturing organization that had implemented the TQM philosophy. Utilizing a large sample and controlling for Demings bias this study found the training techniques to be quite successful in enhancing the inventory management and production scheduling knowledge level of the trainees.

OVERVIEW OF TOTAL QUALITY MANAGEMENT

Historical Perspective

William Edwards Deming was born on October 14, 1900 in Sioux City, Iowa. It was at the University of Wyoming in 1921 that William Edwards Deming graduated, but he remained for an additional year to study mathematics. He later received his master's degree in mathematics and physics from the University of Colorado and his Ph.D. in Physics for Yale (Walton 1996)

In the summers Deming worked at Western Electric's Hawthorne Plant in Chicago. During this period he was introduced to Walter A. Shewhart a statistician at Bell Telephone Laboratories in New York. The theories that Shewhart had on quality control became the basis for Deming's work. While on assignment with the CENSUS BUREAU in 1940, Deming was able to test some of his quality control theories. He established a better and less error prone way of decoding the surveys, which helped confirm some of his theories on quality.

During World War II Stanford University wanted to help in the war campaign. They decided to ask Deming what they could do. Dr. Deming immediately responded with a four-page proposal for teaching the Shewhart methods of Statistical Quality Control [SQC] to engineers, inspectors, and others at companies engaged in wartime production (Walton 1986). Once again statistics was introduced as an easy ingredient to one of Deming's theories on quality.

QUANTITY NOT QUALITY, THE AMERICAN WAY AFTER WORLD WAR II

After the war Deming was very excited about the prospects of sharing his quality control ideas with the United States manufacturing sector. Almost all production capabilities were based on war equipment, which put products like cars, radios, and other appliances on hold. As a result of this eagerness to buy demand was much greater than supple (Amacher and Sweeney, 1980) Quality in these postwar years took a back seat to production getting the numbers out therefore, Deming and his colleagues were put on the back burner.

Deming was very discouraged with the U.S. manufacturers because they delayed quality was too time consuming and unnecessary. The manufacturers were making enormous products their only concerns were putting out numbers. The more they produced the greater the profit. Deming relayed they were making a big mistake which did come back to haunt them until decades later. Deming bitterly realized that few American managers would concede that high quality can mean lower cost (Ferguson, 1990)

Japan's Willingness to Accept Deming and Their Success

In 1945) Dr. Deming was elected by the Supreme Command for the allied powers to help prepare a 1951 census of Japan. Meanwhile a group called the Union of Japanese Scientists and Engineers (JUSE) had organized to aid reconstruction of their country (Deming 1982) The only problem was they did not know where to begin. (JUSE) knew that to bring Japan out of the gutter and on the upswing they would have to produce quality goods that others would want. Once quality goods were produced then Japan could import food, which they dearly needed. JUSE"s problem was not what to do but, how to go about the task that they assigned themselves.

In March 1950 JUSE managing directors (Kenchi Kryanagi) wrote Deming asking him to deliver a lecture course to Japanese Research workers plant managers, and engineers of quality control methods. This set the wheels in motion for quality based Japan because Deming accepted without payment. Deming made several trips to Japan in the ensuing years to have more lecture series and observe the progress being made. Some noted progress stated that six weeks after applying Demings concepts several companies reported productivity gains in as much as 30 percent without purchasing any new equipment. This improvement must have

Provided great encouragement to these companies and others because productivity and quality increased drastically.

Thirty years later, they emerged a world leader in production and quality. It is interesting to note that by the 1970's having experienced the pains of the OPEC oil embargo, American managers were touring Japanese companies with aspirations of learning form their techniques in quality and production. The cycle seems to have taken a 180-degree turn form World War II.

Unfortunately the Americans were not able to learn much due to short trips and language barriers. Another problem for the Americans was the quick fix syndrome". The Americans did not want to put forth the effort to make changes in quality. At this time in the United States, managers believed that productivity and quality problems ere due to unions, workers, government regulation and anything else but their own antiquated philosophies (Sheaf 1991)

AMERICANS FINALLY BEGIN TO ADOPT DEMING AND TQM

In June of 1980 TQM became a possible solution it was not an over night solution but by this time U.S. companies and managers were desperate. The answer was on a 90 minute NEC White paper document. "If Japan can… Why can't we?. Which examined the achievements of Japanese and American industries in quality and productivity and introduced Japan's quality guru, and American named W. Edward Deming (Michaelson, 1990). For the second time in history W. Edwards Deming was introduced to the United States. The broadcast aired to a very receptive audience with great success. It honored a man who really deserved it. So, it took Deming four decades to introduce his ideas on quality. This opened the door for other quality gurus such as Joseph Juran, Philip Crosby, Generhi Taguchi, Arnand Feigenbaum, and many more.

These gurus all believe that total quality management is the only way to survive the future. Total quality management is a philosophy which emphasizes the need to meet customer needs precisely and the importance of doing things right from the start. Hendricks and Triplett, 1939) By now most senior executives have an understanding of total quality at the intellectual level. (Gilks, 1990) The next step is not to just understand total quality but to believe in it. If this belief ------ to top level management then the process can survive

Deming would lecture his theories on statistic controls and his 14 points in TQM Demings 14 points are steps that companies may follow to increase quality and productivity, which will reduce costs and increase profits. These lectures were very helpful in Japanese quality and production in the East four decades ago and could bring the American Manufacturers out of the doldrums in which they are sinking.

In total quality management, the main idea is perfection or 100 percent accuracy. Crosby's slogan for this is "zero defects" (Zemke, 1990) If things are done right the first time there will be no errors or defects, therefore; mass inspections will be an obsolete process.

Zero defects is the ultimate goal for managers and workers. To achieve this goal the institution of continuous on-the-job training is imperative (Scherkenbach, 1988) Only changing company processes will not ensure continued improvements. The managers must provide training to all employees, this can eliminate confusion between workers as well as departments (Butterfield, 1991) Managers may want to introduce educational programs. When these training programs are successful, They can establish quality work along with teamwork and self-esteem.

Once workers become involved in such programs, which enforce self-esteem and teamwork, they begin to take pride in their work. The rationale is that participation leads to commitment and ultimately to ownership of the process. If these feelings can be obtained through the idea that workers are important and respected then the workers will be interested in the work yielding great progress in quality and productions, Thus the purpose of this study was to test the efficiency of inventory management and production scheduling training in an organization that had adopted a TQM environment.

RESEARCH DESIGN

Sample Population

The sample population was comprised of personnel working in the materials handing inventory control, production control and production scheduling functions in a large manufacturing organization. The average age ranged from the mid-20's to late 50's. The average tenure of employment range; from 5 years to 40-plus years. The sample was fairly evenly divided into males and females. Their formal education ranged from some high school to those who had obtained a college degree.

Composition of the Training

The Training consisted of two different workshops. The first workshop covered inventory management material and the second workshop covered production-scheduling material. Each workshop was comprised of two consecutive four-hour blocks of time for a total of sixteen hours of training plus approximately four hours of homework completed by each participant. The training- consisted of lecture problem solving activities related video instruction media experiential exercises performed in teams and homework to be accomplished after hours on an individual basis.

The Pretest and the Posttest

To measure any increase in the awareness of the subject matter, a pretest was administered at the very beginning of each workshop followed by a posttest administered at the very end of each workshop. The 20 questions comprising each test were prepared from popular production operation management texts and questions from the American Production and Inventory Control Society Test Bank. The questions were randomly selected from a master test bank that was prepared form these sources. Paired pretests and posttests were obtained from 215 participants in the Inventory Management workshop and 167 from the participants in the Production scheduling workshop.

Control for the Demand Characteristic

In this type of research a common cause of serious bias arises from participants responding to researchers the way they think the researchers want them to respond. This demand characteristic poses a special threat to the validity and reliability of a research project. Because of the extremely technical nature of the subject matter, it would be virtually impossible to bias their response to the tests. In addition: at no time was the true intent of the study revealed to the participants.

RESULTS

Analysis

Table 1 reflects the mean scores and standard deviation of the pretests and posttests results obtained from the Inventory Management training. The mean scores on the pretest and the posttest were 10.6% and 15.5% respectively. The learning gain generated a p-value of 24.6% significant at a p-value level less than .001.

Table 2 reflects the mean scores and standard deviations of the pretests and posttests results obtained from the production scheduling training. The mean scores on the pre-test and the posttest were 0.4% and 16.6% respectively. The learning gain generated a p-value of 27.5% significant of a p-value level less than .001.

Discussion

The results in this study offer strong evidence as to the TQM tenent of the value of training. In both workshops, sizable gains in knowledge level was obtained as measured by the pretest –posttest comparison. The researchers are will aware that a portion of this gain can be attributed to maturation and normal exposure to the training materials. Even discounting a portion of the knowledge gain to these research contaminates, the sizable gains in knowledge strongly suggests the value of such training.

In addition to the pretest-posttests measurements, another technique of research triangularization was utilized in this research design. Participants were also asked to write down points of new information that they had obtained in these workshops that could improve the quality and productivity of their jobs. In the majority of cases, many new ideas were reportedly obtained from the workshops that could enhance their job performance. One futher caveat from this study that is worthy of note is the very positive responses received by the instructors for their presentation of such technical training. Participants rated these workshops a 4.4 out of a possible 5.0 for the quality of the workshops.

CONCLUSION

There has been a great turn of events in the manufacturing world since World War II. The United States was the leader in the world market but they did not make any effort to sustain their grip on the work. In the meantime gurus such as W. Edward Deming and Joseph Juran traveled to Japan to assist them in areas of quality and production. Finally the United States manufacturers decided to do something about their problem by adopting TQM. IF American manufacturers can stick to total quality management it will in turn enhance quality by improving the entire company. With the all-important goal of quality and customer service. Empowering employees and making them more productive through extensive and continuous training. Will afford more productivity and quality improvement leading to an enhanced level of world market share. This study has offered significant evidence that training can and does work.

Table 1
INVENTORY MANAGEMENT TRAINING
RESULTS OF PAIRED T-TESTS

VARIABLE	MEAN	STANDARD DEVIATION	DEGREES OF FREEDOM	P VALUE	P VALUE
PRETEST	10.5	2.52	214	31.87	.000
POSTTEST	16.53	2.0			

*SIGNIFICANT AT <.001

TABLE 2
PRODUCTION SCHEDULING TRAINING
RESULTS OF PAIRED T-TESTS

Variable	Mean	Standard Deviation	Degrees of Freedom	t value	P Value
Pretest	9.43	2.79	166	27.88	.000
Posttest	15.50	2.30			

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