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A key content area in Industrial Technology programs is the description of quality initiatives consistent with the beliefs of W. Edwards Deming. Although not a social scientist, Dr. Deming proposed ideas that impact the social science community. One idea that has been particularly difficult to operationalize is "drive fear from the workplace." This is one of Deming's 14 quality principles that focus on organization improvement.

Womack & Jones (1996) wrote that change is most often the outcome of an organizational need to reduce cost, reduce cycle time or to improve quality. Change that brings organizational improvement, even though well planned, affects individuals within the organization in different ways (O'Toole, 1995). In fact, according to Dettmer (1997) what may be considered, as an improvement to one individual may simply be a "change" to another. This dichotomy creates organizational apprehension that does not subside. Because of the significant impact that change has on both organizational and individual performance, choosing the right "change strategy" has become a key component in the process of organizational improvement.

The key to acceptance of change is based essentially on how well the need for, and the benefits arising from, the change are communicated to the employees. Frequently companies do not adequately evaluate this need for special communication and the reactions to new ideas or changes manifest themselves in the form of employee stress and ultimately fear/anxiety. If they feel "psychologically safe" (Schein, 1993) and not threatened, their opposition to change will be dramatically reduced.

W. Edwards Deming (1986), in his book <u>Out of the Crisis</u>, wrote:

*No one can put in his best performance unless she (he) feels secure. Se comes from Latin, meaning without, cure means fear or care. Secure means without fear, not afraid to express ideas, not afraid to ask questions. Fear takes on many faces. A common denominator of fear in any form, anywhere, is loss from impaired performance and padding figures. Another loss from fear is the inability to satisfy specified rules, or the necessity to satisfy, at all costs, a quota of production. (pp. 59 & 62)*

To drive out fear, Deming suggests, that employees must not be blamed for faults of the system, people must be made to feel "okay" about making suggestions and people must be able to question work methods and purposes without fear of reprisal.

There is no universally accepted clinical definition of fear when applied to the workplace. Because fear is so difficult to define it is instead considered to be an outcome of stress (Motowidlo, Packard, & Manning, 1986) along with other elements such as "anxiety, irritation, annoyance, anger, sadness, grief, and depression." Stress as applied to the workplace is occupational stress (Speilberger, 1986) and in this case the stressor or stress process is derived from on-the-job situations that are perceived as physically or psychologically threatening. It is important to understand that this is one of the many

definitions of occupational stress and that like fear, stress is equally difficult to define depending quite often on the model or instrument used to measure it (Vagg & Speilberger, 1998).

Job pressure and organizational support in the workplace (Vagg & Speilberger, 1998) have been found to be key contributors to the level of occupational stress experienced by individuals. Stress or the perception of an event that causes stress leads therefore to some level of fear which may or may not have an impact on personal performance depending on the psychological capacity of the individual(s) involved.

Motowidlo, Packard, & Manning (1986) suggest that there are both individual and organizational (job conditional) inputs that represent the primary sources of stress (see Figure 1). After experiencing certain stressors, individuals were less able to perform effectively which resulted in a "decrease in helping, a decrease in recognition of individual differences, and an increase in aggression." (Cohen, 1980, p. 95). These decrements are consistent with Deming's concept of the impact of fear on organizations that could drive employees to avoid confrontation with supervisors by false reporting and quota compliance (Deming, 1986).

Fear can therefore be considered a direct derivative of stress, for example when organizational change is suggested, the employee stress level typically would be expected to increase due to uncertainty. As time passes without explanation of the projected change, the anxiety level increases and eventually certain employees become fearful for their future.

Motowildo, Packard, & Manning (1986), utilize three separate path analyses and concluded that there are three applicable strategies that could be utilized to reduce stress and its negative affect on job performance. The first two of these strategies are consistent with Deming's ideas as stated in his Fourteen Principles (Walton, 1986). The strategies are:

1. Change the job conditions to eliminate unnecessarily stressful events or at least to make them less frequent.
2. Change the distribution of individual characteristics associated with stressful event frequency and intensity either by (1) selection programs that filter out characteristics likely to lead to high levels of stressful event frequency[1] and intensity, (2) placement programs that assign persons with least stress-resistant characteristics to the least stressful job situations, or (3) training programs that help people modify their behavioral dispositions and reactions to stress so they can become less likely to behave in ways that cause stressful events and less likely to react strongly to such events when they occur.
3. Deal directly with depression. (p. 627)

When the *status quo* is disturbed by change, i.e. an external or internal event such as the implementation of a quality change program with the intention to reduce fear, fear may actually increase. This increase in fear may be temporary and based on the extent of the quality program implementation process. It may eventually demonstrate that quality initiatives that lead to organizational change may be instrumental in reducing employee fear/anxiety within the organization.

## Purpose

Organizational change is known to generate stress and possibly fear/anxiety in employees (Tosi, Rizzo, & Carroll, 1986). A precept of quality improvement programs is to eliminate employee fear as an impediment to improved quality in products and services. The issue of concern is that the impact of quality improvement program implementation on employee fear/anxiety has not been adequately investigated.

This concern is addressed by:
1. determining the impact of a quality improvement training program implementation on fear/anxiety in organizations.
2. identifying whether the level of quality implementation, sex, years of formal education, years of employment with the organization, organization size, age or job type significantly influence the level of fear/anxiety in organizations that are or have been involved in the quality improvement education process.

## Methodology

Considering that stress is a direct precursor to fear/anxiety (Motowidlo, Packard & Manning, 1986), it is therefore concluded that measuring occupational stress will provide a consistent relative measure of fear for employees of any given organization or

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[1] The model did not show any causation between the frequency of stressful events and their subjective intensity, but there was an observed correlation (r=0.27, p<0.01) (Motowildo, Packard, & Manning, 1986).

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**Figure 1: Preliminary model of the causes of occupational stress and its consequences for job performance**
*Note: From "Occupational Stress: Its Causes and Consequences for Job Performance", by S. J. Motowildo, J.S. Packard, and M. R. Manning, 1986, Journal of Applied Psychology, 71 (4) p.619*
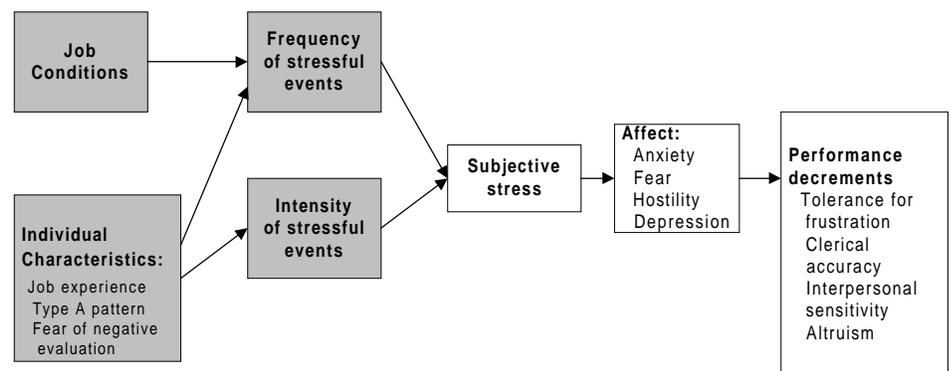
group of organizations. The sixty question Job Stress Survey (JSS) (Vagg and Spielberger, 1998) was chosen to assess the occupational stress and hence the level of fear within the participating organizations because it considered both job and organizational inputs to the level of stress (fear) based on both severity and frequency of occurrence.

The level of quality program implementation for each organization was determined using the Organization Quality Program Implementation Assessment (OQPIA). The OQPIA was developed utilizing the 1999 Malcolm Baldrige National Quality Award (MBNQA) criteria as a guideline. The OQPIA included those MBNQA components that were directly related to the training provided by the single organization associated with the organizational quality improvement program. The OQPIA was validated by a panel of experts to assure content validity before it was used to rate the 22 organizations on their level of quality implementation.

The JSS was administered to employees within 24 Iowa organizations and one Utah organization. Twenty-two of the organizations were being or had been educated in the continuous quality improvement process by a single organization with a unique approach to organization intervention. Usable responses were obtained from 1858 employees. Of these, 1796 were from organizations that had been educated in continuous quality improvement by CCQI.

## Results

The reliability and validity of the JSS for this study was established by replicating the procedure used to develop the JSS by Dr. Charles Spielberger and showing that the resulting alpha coefficients and subscales were consistent with the original JSS outcomes.

The Organization Quality Program Implementation Assessment (OQPIA) was used to measure the level of quality implementation in participating organizations. The OQPIA was developed using portions of the Malcolm Baldrige National Quality Award (MBNQA) that were

consistent with those components taught as part of the education process. The hypotheses were tested using correlational and analysis of covariance procedures.

### The impact of quality implementation on "fear"

The first hypothesis tested whether there was any significant correlation between the level of organizational fear as measured by the JSS and the level of quality implementation as measured by the OQPIA. The impacts of sex, years of employment, organization size, age of the respondent, years of respondent education and job type on the level of fear were tested by the other six hypotheses.

The findings indicated that there was no significant correlation between the level of fear and the OQPIA score, at the $p < 0.05$ level. Further testing using an unconditional model with the level of quality implementation (OQPIA score) as the only main effect was consistent with the outcome of the conditional testing.

Since the tests with both unconditional and conditional models provided the same results, it is concluded that the lack of significance of the level of quality implementation is not due to discrepant results that could have been caused by the difference in partial and ordinary F test procedures.

The mean OQPIA score varied widely between organizations. The small organizations had a higher mean score than the large organizations, but there was no clear pattern of OQPIA ratings that would obviously contribute to this lack of correlation.

The finding of no significant relationship between fear and the level of quality implementation may have been affected by a lack of instrument validity for measuring the level of quality implementation and/or poor rater reliability. The OQPIA was developed from an existing evaluation tool that was reduced in scope to be consistent with the purposes of this study. A panel of experts established face validity of the OQPIA. Ratings of individual companies were generated by individuals who were separately knowledgeable of individual organizations, but not all individuals were

knowledgeable of all organizations. It was assumed that because the associates received the same training and their training sessions were monitored to assure uniformity, that any differences in establishing the organizational OQPIA rating would be random and not affect the outcome. Any of these issues considered individually or in combination may have contributed to type II error.

### The impact of other independent variables

The relationship between the level of organizational fear/anxiety, as measured by the Job Stress Survey (JSS), and selected demographic variables was investigated. Table 1 provides a summary of the results of these analyses using a conditional model. As was the case with the degree of quality implementation, the analyses yielded no significant difference in the level of fear reported by males and females.

The findings indicated that there was a significant correlation between the level of fear and five categories of job type, years of employment, age of the respondent, years of individual education and organization size with each of the respective six independent variables in the model. Further testing using an unconditional model with each of the six independent variables as the only main effect confirmed the outcome of the conditional testing. The Bonferroni method of multiple comparisons produced a significant difference between job type 1 (supervisor) and the other four job types (manager, professional, clerical and worker).

The significantly greater level of fear at the supervisory level may be caused by a wide variety factors such as: organizational structure, organization size and type of organization to suggest a few. In each case though, the fact that the supervisor is the single individual that is required to deal with the largest number of subordinates and superiors on a routine basis may help explain why supervisors report a higher level of fear/anxiety.

## Implications for industrial technology

One outcome of this study was to provide an explanation of the relationship between fear, anxiety and stress that the authors suspect has been inadequately addressed in industrial technology quality management classes. Stress on the job often leads to anxiety and fear. Anxiety is believed to be a precursor to fear. Fear is an emotion that may result in performance decrements. The cause of this powerful emotion may not be readily apparent without looking at the antecedents on the job. A portion of a lecture in at least one quality management class that addresses the conditions that lead to fear and possible performance decrements should be included in all industrial technology programs.

The results suggested a positive relationship between tenure, organization size and education with fear/anxiety and a negative relationship with age. Organizations and companies should consider organization size, employee education, employee age and employee tenure when developing training strategies. Individuals preparing students to serve in a change agent role should consider these findings and begin to develop appropriate strategies.

Persons in supervisory jobs reported a higher level of fear/anxiety than those occupying other job types. To help reduce the level of reported fear associated with the supervisory position, special orientation and training programs should be designed for the supervisor when program changes are implemented. Such supervisor training programs should contain information about the conditions that lead to fear and identify potential fear decrements. The supervisor's role in the change process should be clarified as well.

No significant relationship between the level of quality program implementation or sex and the level of fear/anxiety was found. The finding regarding the impact of quality implementation appears to be inconsistent with the anecdotal comments provided by employees which suggest that this quality implementation program does promote communication and help alleviate fear/anxiety. Therefore further study is essential to clarify any possible relationship between the level of fear/anxiety as impacted by quality program implementation. The finding regarding sex is consistent with previous studies (Spielberger & Vagg, 1999).

Understanding the relationship between fear/anxiety and the implementation of organizational change is clearly an important component in the development of Industrial Technology programs that emphasize quality issues. It is not appropriate to simply cover statistical processes and quantitative systems without providing some understanding of related social and behavioral science concepts. Faculty involved in all aspects of the delivery of Industrial Technology programs need to be cognizant of individual and organizational differences when teaching quality program management/implementation.

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*Table 1: Statistical summary of fear by independent variable*

| Source | df | SS | MS | F | Pr>F |
|---|---|---|---|---|---|
| Job type | 4 | 2819.88 | 704.97 | 6.03 | 0.0001** |
| Sex | 1 | 146.88 | 146.88 | 1.26 | 0.2623 |
| Org Size | 1 | 583.24 | 583.24 | 4.99 | 0.0256* |
| Educ | 1 | 550.62 | 550.62 | 4.71 | 0.0301* |
| Tenure | 1 | 4803.36 | 4803.36 | 41.12 | 0.0001** |
| Qualimp | 1 | 0.08 | 0.08 | 0.00 | 0.9797 |
| Age | 1 | 3309.99 | 3309.99 | 28.33 | 0.0001** |

*P<.05; **P<.01

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