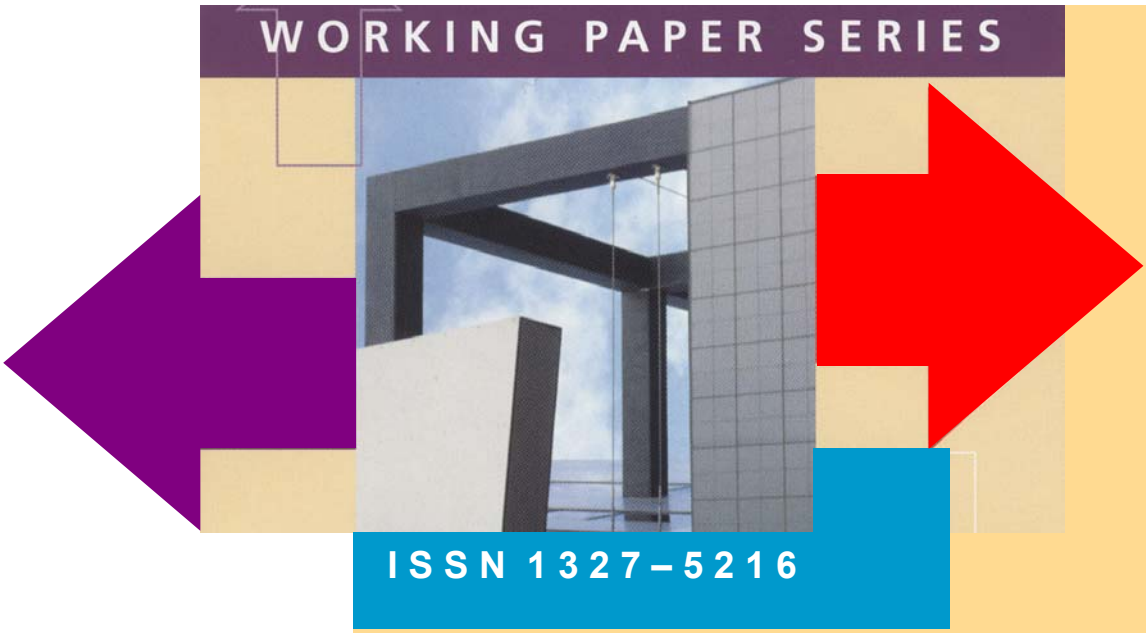
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EMPLOYEE TRAINING, QUALITY MANAGEMENT AND THE PERFORMANCE OF AUSTRALIAN AND NEW ZEALAND MANUFACTURERS

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Abstract

The paper examines the relationship between employee training and quality management practice by analysing data from a large cross-sectional study of Australian and New Zealand manufacturers. The paper examines two hypotheses that are used to explain the impact of training upon organizational performance – the task effectiveness hypothesis and the strategic effectiveness hypothesis. Multiple regression analysis is used to test these hypotheses and to examine the impact of training and quality upon productivity, customer satisfaction and employee morale. Some support is found for both hypotheses of training effectiveness but employee training is found to have a more significant impact upon organizational performance when combined with Total Quality Management. The implications of this finding for the implementation of quality management programs are discussed and some further questions are posed for future research in this area.

This paper is a work in progress. Material in the paper cannot be used without permission of the author.

DEPARTMENT OF MANAGEMENT

EMPLOYEE TRAINING, QUALITY MANAGEMENT AND THE PERFORMANCE OF AUSTRALIAN AND NEW ZEALAND MANUFACTURERS

INTRODUCTION

The adoption of quality management practices has long been associated with an increase in the provision of employee training. The founders of quality practice in manufacturing emphasised the importance of employee development, education and training for the improvement of quality performance and firms seeking to implement quality management have consistently found it necessary to improve their training effort (Deming 1982, Ishikawa 1984). Firms pursuing a quality strategy have found it necessary to invest in 'human-capital-enhancing' activities such as training, in order to enhance performance improvements in productivity and customer satisfaction (Youndt, Snell, Dean and Lepak 1996).

Employees require some training in order to manage the enlargement of their work role following the delegation of responsibilities for quality, they also require some training in non-technical skills to be able to participate in quality improvement activities and they need a broader range of skills in order to flexibly respond to changing customer and market requirements (Schonberger 1994). Training for quality management requires the development of specific skill sets that support quality management practices. Such training is important, not only to ensure the successful adoption of quality practice, but also to ensure the achievement of the broader quality mission of improved firm competitiveness (Dertouzos, Lester and Solow 1992). The success of the quality strategies adopted by the firm and the effectivness of the quality management system employed within the firm, are dependent upon the supply of appropriately skilled labour (Mason, van Ark and Wagner 1996, Prais 1995).

Whilst the association between the adoption of quality management practices and the enhancement of the training effort in the firm has long been observed, little attention has been paid to the relationship between quality management, employee training and firm performance. Two competing explanations have been put forward to explain the effect of quality management and employee training on firm performance and this study seeks

Some studies have suggested that employee training directly enhances firm performance by raising the general level of skills. As employees become more highly motivated and more highly skilled, so their task performance improves and organizational effectivness is directly enhanced (Bartel 1994, d'Arcimoles 1997). Employee training may, in this view, be seen as a discrete or stand alone management practice, one that directly enhances the human capital of the firm and so directly leads to performance improvements.

Other scholars argue, however, that employee training has a mediated rather than a direct affect upon firm performance. These scholars argue that employee training is more effective when used in conjunction with other management practices and that compatible sets of practices are more effective in raising performance, than any individual practice. This argument suggests that training, whilst effective in raising general skills, is more effective when it develops firm specific skills and so supports the operation of the particular business process systems within the firm. Training, when used to support quality management practices, should contribute to the effectivness of the quality management system . Training should enhance the integrity of these systems, rather than merely raise the general level of employee skills (Gee and Nystrom 1999, Jayaram, Droge and Vickery 1999).

This study seeks to unpack some of the relationships between quality practice, employee training and firm performance by examining the direct and the mediated effects of quality practice and training practice. The study seeks to determine whether the provision of employee training alone directly affects performance or whether training is more effective when mediated by the quality management system. In order to address these questions, data from the Australian Manufacturing Council (AMC 1994) survey of Australian manufacturing firms is examined and the impact of training and quality practice on key performance outcomes such as productivity, customer satisfaction and employee morale is analysed.

LITERATURE REVIEW

The Importance of Training

There are well established links between the provision of employee training and use of quality management practices but there is some debate about the extent to which the two practices may work together to enhance performance outcomes. Several empirical studies of enterprise training and performance have found no necessary link between employee training and the use of other management practices (d'Arcimoles 1997, Bartel 1994, Holzer, Block, Cheatham and Knott 1993). These studies suggest that training, in and of itself, can enhance the performance outcomes of firms.

Snell and Dean (1992) found that the use of advanced manufacturing technology (AMT) and the use of quality practices were both associated with the 'comprehensiveness' of employee training but they found no interaction effects from the use of these practices in combination.

Bartel (1994) examined job redesign, performance appraisal and employee involvement, finding that training was 'unaffected' by the implementation of these practices, in its performance enhancing effects. Bartel used a value-added measure of productivity based upon net sales per employee and found that the introduction of new training programs led to a productivity gain of 18.86% over three years. Significantly, this gain applied across the board to low performing and high performing companies, leading Bartel (1994:422) to observe that: "the implementation of formal employee training programs can enable businesses that are operating at below-expected levels of labor productivity to eliminate this gap."

Holzer, Block, Cheatham and Knott (1993) studied the effect of training grants on firms training effort and found that the one off training grants led to a doubling or tripling of the training effort during the period of the grant. This increased training effort was associated with a 0.5 to 0.7 percentage points decline in the scrap rate, a gain which persisted after a decline in the training effort. It was the extent of the training effort that seemed to influence improvements in quality outcomes rather than any necessary use of quality practices.

d'Arcimoles (1997) examined the effects of employee training upon the financial performance of 61 French firms and found that there were significant immediate and lagged effects. Expenditure on training by firms was associated with 'immediate and permanent' improvements in productivity and profitability, leading d'Arcimoles (1997:865) to find that: "substantial training expenses seem to be a good sign of future economic performance."

Training, some would suggest, has a direct effect on productivity, internal quality and financial outcomes for firms, by raising the general level of skills and enhancing the human capital of the firm. This effect is seemingly independent of the application of quality management and other management practices. Employee training, in this view, is a stand alone practice that leads to effective task performance on the part of employees and this is reflected in enhanced firm performance.

Figure 1 about here

The implication to be drawn from treating employee training as a stand alone practice is that the effect of training upon performance is discrete and not necessarily the product of the interaction of a comprehensive training and development system with a quality management system. The direct effectivness view does not posit any systemic benefits arising from the strategic alignment of quality practices and training practices, but rather seeks to identify stand alone benefits that are derived from the training effort itself.

One of the difficulties with this position, however, is that it does not seek to distinguish between firm investments in different types of human capital through the provision of different types of training program. There is no distinction made between investments by the firm in general or firm specific skills (Becker 19xx). Any effort to augment the human capital of the firm by the provision of employee training is seen to

be effective, whether that consists of investments in general, transferable vocational skills or firm specific skills that complement the technical and human requirements of the individual firms quality system. The proposition that general skill development, achieved via stand alone training programs has a direct, positive effect upon firm performance, is one that we seek to exaime here.

Hypothesis H 1. That the firm provision of employee training raises the general level of skills and this has a direct, positive affect upon firm performance outcomes.

Employee Training and Quality Management

Employee training has frequently accompanied the introduction of Total Quality Management programs. A survey of Fortune 1000 companies in 1993 (Lawler, Mohrman and Ledford 1995:16) found that 72% of US firms had provided some training in problem solving skills and 63% had provided some training in the use of quality tools, when introducing quality management practices.

Australian firms, likewise, have implemented employee training programs in order to support the introduction of quality management practices. A recent survey of Australian manufacturers (Allen Consulting Group 1999:vi) found that improvements in quality (93%) and competitiveness (88%) were the most common objectives of firms implementing training, whilst Smith and Hayton (1999:264) in their survey of Australian firms, found that an emphasis upon quality improvement was "a consistently significant driver of enterprise training."

The emphasis placed upon training by Australian firms to achieve quality objectives is supported by the available case study evidence (Rimmer, Macneil, Chenhall, Langfield-Smith and Watts 1997, Dawson 1994, Dawson and Palmer 1995) and survey evidence (Park, Erwin and Knapp 1997, Smith and Hayton 1999). Park, Erwin and Knapp (1997:789), for example, surveyed 47 of the largest firms in the Australian automotive industry and found that 89% provided training in problem solving skills and 81% provided training in the use of quality tools.

The implementation of quality management programs has been an important driver of the training effort of manufacturers but whether and how quality management programs and employee training programs jointly act to lift performance remains unclear. Does training have a discrete effect upon performance or do training and quality practices reinforce each other to jointly lift performance?

Some scholars hold that human resource management practices and production practices do reinforce each other and that the provision of training is not as important as the strategic targeting of that training to the achievement of business objectives (Pfeffer 1998). In the case of training, the type, amount and level of employee training, it is argued, should be closely aligned to the objectives of the training and these objectives should be consistent with overall business strategies (Arthur 1994, Becker and Gerhart 1996, Lado and Wilson 1994). Training should only be undertaken where it is strategically important to do so and where the training effort can have maximum effect.

Training delivers greater benefits, some scholars argue, if management focuses upon the strategic effectiveness of that training rather than simply upon its ability to enhance employee task effectiveness. Employee training is of greater value to the firm in developing human capital if its affect is mediated by the quality management system. If firm specific skills are developed that not only improve the skills of individual employees but also enhance the effectivness of the quality management system... skills should

This line of argument posits a mediated effect as an explanation for the effect of training upon performance, as a counterpoint to the direct effect examined above. The strategic effectiveness thesis holds that there are benefits to be derived from employee training, if that training is part of a consistent set of human resource management practices (Brown, Reich and Stern 1993) and that set of human resource management practices is aligned to production practices for the achievement of strategic business objectives. If there is internal consistency in the work and production systems of the enterprise, then this generates a systemic benefit that is reflected in higher performance (MacDuffie 1995). In the case of quality, the strategic effectiveness thesis holds that the training effort should be targeted to the type of quality management program being

implemented and that the training should be supported by mutually reinforcing human resource management initiatives, such as employee involvement in problem solving.

There is some evidence that manufacturers implementing quality management programs do strategically target their training effort (Monks, Buckley and Sinnott 1998). Many manufacturers, it seems, do provide training that is tailored to the type of quality management program that is introduced. The more extensive the quality management program, the more comprehensive is the training. Skills are developed that underpin the integrity of the quality management system

Gee and Nystrom (1999:20) studied the levels of skill training in 342 US manufacturing plants and found that "different levels of skills training are strategically related to different levels of quality management practices." Limited and one-off training programs were associated with quality by inspection whilst comprehensive employee training was associated with the adoption of full Total Quality Management (TQM) programs.

Jayaram, Dorge and Vickery (1999) in their study of 57 first-tier component suppliers in the US automotive industry likewise found that the training effort of these manufacturers was strategically targeted to achievement of operational priorities. Employee training was targeted to the achievement of priorities such as cost, quality, flexibility and timeliness and was also associated with performance improvements in these areas.

There is thus some support for the strategic effectiveness thesis. Manufacturers do seem to strategically target their training efforts. They focus their training and development programs upon areas of strategic priority and reap benefits from this in the form of performance improvements.

In order to further research the strategic effectiveness thesis, in order to determine whether the implementation of comprehensive training and development practice has effects upon performance outcomes for the firm when used in conjunction with comprehensive quality practices, we test the following hypothesis:

Hypothesis H 2. That the firm provision of employee training has a mediated affect upon firm performance.

METHODOLOGY

Background

The two hypotheses advanced here were tested by analysing data from a mail survey of Australasian manufacturers that was conducted in 1994 by the Australian Manufacturing Council (AMC) in conjunction with the Australian Bureau of Statistics and the Manufacturing Advisory Group (New Zealand). The survey consisted of 246 separate questions and was developed by a panel of academics and managers. The questions were based upon the quality system evaluation frameworks of major quality awards including the Malcolm Baldridge Quality Award (MBNQA), the Australian Quality Award and the European Quality Award.

The survey was sent to 3,000 Australian and 1,000 New Zealand manufacturing sites that were randomly selected from manufacturing sites that employ more than 20 people and were registered with the Australian Bureau of Statistics or Statistics New Zealand. At each site the most senior manufacturing manager responded on behalf of the organization. Responses were received from 1289 sites; 962 in Australia and 327 in New Zealand giving response rates of 32% and 38% respectively.

Data Preparation

The research reported here proceeded in two stages, the first covering item selection and the second the screening of the data for biases and incomplete responses. In the first stage an item relating to the comprehensiveness of employee training and 40 items relating to TQM were selected. The TQM items were

organized into six constructs based upon the MBNQA award framework: leadership, customer focus, people management, strategic planning, information and analysis and process management.

In the second stage, incomplete responses and potential biases were dealt with. Of the 1289 responses to the AMC survey, those with more than six empty cells among the identified items were deleted and the remaining responses with missing cells were dealt with by imputing a variable mean. This approach yielded 1024 responses. Owing to the length and complexity of the survey, the responses were also tested for response biases, including respondent fatigue and awareness of respondents to question changes. Little evidence was found of any such biases (Ergas & Wright 1994, Terziovski, Samson and Dow 1997).

Independent Variables

The extent of employee training was identified using a survey item based upon a five point Likert scale and a TQM model was developed consisting of 40 independent variables also based upon a five point scale. The 40 items were selected from the AMC data in accordance with their factor loadings obtained from Principal Components Factor Analysis (Hair, Anderson and Tatham 1992). The 40 items were loaded on a single TQM factor. Each item had a loading greater than 0.3. This supports the construct validity of the model. Content validity is supported by comparing the model with other models in the literature (General Accounting Office 1991). The internal consistency of the TQM model was checked by using Reliability Analysis. Internal consistency was estimated using a reliability coefficient Cronbach alpha. An alpha of 0.8 was recorded thus indicating that the coefficients were within the established range of 0.7 to 0.9 (Van de Ven and Ferry 1979). The TQM model is thus reliable.

Dependent Variables

Enterprise performance was identified by the use of three important variables: productivity improvements, levels of customer satisfaction and employee morale. In each case respondents to the AMC survey were asked to indicate the level of their plant's performance on these variables using a five point scale. Productivity is an important global measure of enterprise performance and several studies of training have sought to identify training's impact upon the bottom line (Bartel 1994, d'Arcimoles 1997). Customer satisfaction is an important measure of quality that is also seen to be widely effected by employee training (Oakland and Oakland 1998, Wong, Marshall, Alderman and Thwaites 1997). Finally, employee morale is an important variable and employee opinion surveys are used by many quality focused enterprises to provide feedback about employee attitudes towards the company. Employee participation in improvement activities is dependent upon the willingness of employees to participate and as Schonberger (1994) notes, a positive employee orientation to the company has other benefits as well:

> "The uplifting effects of training and development tend to improve attitudes of the workforce, which can lead to reductions in the unpleasant side of employee relations: dealing with sub-standard performance, grievances, absenteeism and other dysfunctions" (Schonberger 1994:119)

RESULTS AND ANALYSIS

Analysis of variance (ANOVA) was used to test both hypotheses and the statistical analyses were undertaken using SPSS Windows v 6.0. The analysis shows that employee training does have the predicted positive effects upon performance.

Training and Task Effectiveness

Employee training was found (see Table 1.) to have a small effect upon performance thus providing some support for *H 1* the task effectiveness hypothesis. The greatest effects were on productivity and employee morale with only a marginal impact upon customer satisfaction being recorded. This is consistent with the task effectiveness hypothesis which holds that stand alone training gives employees a positive orientation to their work role and enhances their task performance by developing their skill levels. Such stand alone

training thus enhances general effectiveness without necessarily improving any particular aspect of performance.

Table 1. The impact of employee training.

Firm Performance Item (dependent variable)	**Training & Development**		
	R Squared	**T values**	**Significance**
Productivity improvement	$r^2 = 0.052$ Adj $r^2 = 0.051$	7.484	p - 0.000
Customer satisfaction	$r^2 = 0.016$ Adj $r^2 = 0.015$	4.122	p – 0.000
Employee morale	$r^2 = 0.048$ Adj $r^2 = 0.048$	7.156	p – 0.000

Training and Strategic Effectiveness

The results of the ANOVA analysis also indicate that employee training was more efficacious when used in conjunction with quality management practices (see Table 2.) and this provides some support for *H 2* the strategic effectiveness hypothesis. Employee training had a moderate impact upon performance when combined with Total Quality Management and this impact was greater than for training alone. There thus appears to be some systemic benefit that is derived from the use of employee training in conjunction with quality programs. These benefits were recorded for all the performance items and were thus specific as well as generalised.

Table 2. The impact of training and quality

Firm Performance Item (dependent variable)	**Training & Development + TQM Practice**		
	R Squared	**T values**	**Significance**
Productivity improvement	$r^2 = 0.165$ Adj $r^2 = 0.160$	Leadership 5.612 Customers 2.021	p – 0.000 p – 0.044
Customer satisfaction	$r^2 = 0.114$ Adj $r^2 = 0.108$	Customers 4.570 People 3.925	p – 0.000 p – 0.000
Employee morale	$r^2 = 0.266$ Adj $r^2 = 0.261$	Leadership 8.426 People 6.330	p – 0.000 p – 0.000

The analysis also provides some support for the proposition that employee training is more effective when it is part of a set of human resource management practices. People practices (teams, communication, pay) were significantly related to performance improvements in employee morale and customer satisfaction. The analysis thus underlines the value of the strategic effectiveness hypothesis but it also highlights a lacuna in the strategic approach. Leadership turns out to be a significant management practice for employee morale and general organizational effectiveness and yet this is little studied in the literature. The role of leadership as a management practice, from a strategic human resource management perspective, deserves further study.

Limitations of the Study

The findings of the study are broadly consistent with those of other studies of employee training and the effects are all in the predicted directions but the study raises as many questions as it answers. Further work needs to be done to identify the internal mechanisms through which training enhances enterprise performance. Few studies have attempted to identify the type of training program most suited to particular kinds of skill development (Cheng and Dawson 1998) and this kind of fine grained analysis has not been attempted here. We have merely measured the strength of the training effort without enquiring into its components.

A further limitation of the study is that the survey items and independent variables are all based upon the self report of site managers. Some more quantitative measures of the training effort and of the performance of manufacturers, would enhance the rigour of the analysis.

CONCLUSION

Quality management is an important driver of enterprise training. Of all the new management practices, quality management seems to be associated with the greatest increase in the training effort of manufacturers. The good news for manufacturers is that this training effort seems to be paying off. No matter what kind of training program is implemented, employee training seems to have positive effects upon employee morale and general enterprise effectiveness. Training seems to develop a positive orientation on the part of employees towards their work role and the organization and it seems to play a part in lifting performance by enhancing employee skills.

Employee training is seemingly more effective, however, when it is closely combined with comprehensive quality management practices. The close alignment of the training with the development of skills and competencies that are strategically important to the business seems to enhance the value of the training dollar. The nature of the internal mechanisms that produce this effect, however, remain a subject for further study. The kind, length and level of employee training that is most effective, remains a subject for further investigation.

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Figure 1. The Direct Effect of Employee Training

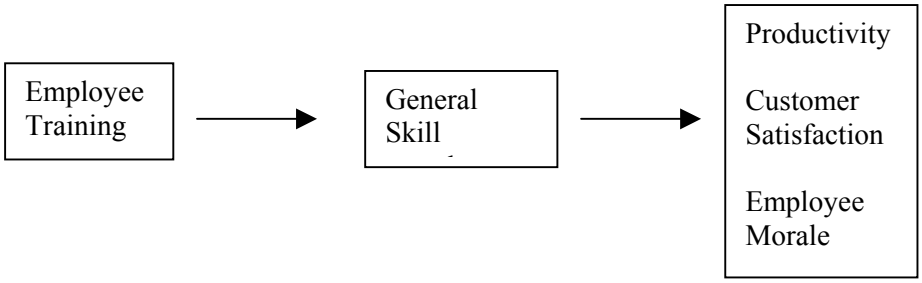


Figure 2. The Mediated Effect of Employee Training

