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by

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## **Workplace Training-Does Reality Match the Theory? An Analysis of Public Sector Employees' Training Decisions**

Sue O'Keefe, Lin Crase and Brian Dollery \*\*

### **Abstract**

The provision of, and participation in, workplace training and development has received significant recent attention in Australia in the face of rapid technological change, challenges of the ageing labour force and purported skills shortages. Accordingly, many organisations have put in place policies and practices that ostensibly aim to encourage and support increased employee participation in training programs. From a theoretical perspective, Human Capital Theory offers substantial insight into the economic benefits of training for the employee and the firm, and (amongst others) provides various predictions about the characteristics of individuals most likely to choose training programs. This paper, drawing on an experimental choice analysis conducted in a public sector organisation, examines the applicability of some of these theoretical predictions to this specific context. More specifically, it focuses on the training choices of highly educated workers.

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## **Introduction**

In the face of rapid and unrelenting change within the workplace and beyond, workers are often told of the benefits of maintaining and improving skill levels through the embracement of training opportunities- or of engaging in ‘lifelong learning’(McKenzie 1999; Burke 2000). This need is frequently seen as increasingly problematic given the demographic change confronting Australia and many other Western nations, and the commensurate reduction in the propensity to train that is seen to accompany advancing age of employees. Economic investigations have consistently cautioned that there is an underinvestment in training and that this results in the effective ‘deskilling’ of the labour force. In short, despite substantial benefits to be gained for the worker and the employer, it appears that the quantum of workplace training falls well short of that which is optimum in an economic sense. Economists point to the conundrum of the financing of general training, in particular, as partly the cause of these problems. In an attempt to resolve this dilemma, the Australian government has even trialled the mandatory provision of workplace training, such as that embodied in the *Training Guarantee Act* (Cth, No 59, 1990) in an attempt to force employers to provide minimum levels of training to their workers.

However, there is another largely neglected side to this equation- worker willingness to participate in such programs. This paper examines the worker’s choice to participate in workplace training programs within a large public sector organisation in Victoria, and focuses specifically on departures from the predictions of theory. The paper itself consists of seven main parts. Part two

briefly outlines some background factors that combine to make training an issue of concern for organisations; whilst part three presents a theoretical context. Part four introduces a technique called choice modelling before reporting on the experimental design of an empirical study conducted in a large public sector organisation. Econometric models of training choice are then developed in part six, before focussing on the implications of these models from an organisational perspective. Some brief concluding remarks are offered in section eight.

## **Background**

The Australian economy has experienced substantial structural and economic change over the past two decades (Shah, Fischer & Burke 2001). This era has seen a move towards a reliance on market forces and an attendant increase in competition. Many public sector activities have been curtailed, privatised or restructured in an attempt to achieve efficiency gains (Quiggin 1999). Economic activity has become more diversified with less reliance on primary production and manufacturing and the concomitant rise in the new 'knowledge industries' (see, for example, Shah et al. 2001). These changes have provided the impetus for a number of initiatives to improve the skill levels of the labour force, including the concept of lifelong learning. Policy documents at national, state and institutional levels have been increasingly framed in terms of a lifelong learning perspective (Curtis & McKenzie 2001). The convergence of the policy aims of decreasing government involvement and fostering the concept of lifelong learning imply an increased role for the individual in shaping and funding their own education and training. The imperative to constrain government expenditure has, according to

Anderson (2004, p. 21), been partly encouraged by the associated intention to pursue ‘market-driven efficiency and economic competitiveness.’ The Organisation for Economic and Community Development (OECD) (1996) attributed the creation of markets for education to the rising prevalence of an economic paradigm in which:

(C)ompetitive forces are assumed to induce providers to use resources efficiently and to offer education services in response to the preferences, needs and interests of learners as consumers. It is a view of education that gives full weight to the freedom of individuals to choose, and by implication minimises the direct role of government (p.165).

Anderson (2004, pp. 1-2) regards these dual policy thrusts as instrumental in the ‘reconfiguration’ of learners into ‘learner-consumers’ who are assumed to be rational self-interested agents making choices within an education market. Accordingly, understanding the choices of these ‘consumers’ becomes prominent from a policy perspective.

However, investment in training brings advantages not only for the economy as a whole, but also for the firm and the individual. Human Capital Theory (Becker 1964) offers a number of enlightening insights in this respect.

### **Theoretical Framework of Human Capital Theory**

Human Capital Theory is based on a neo-classical view of the world, which sees that *homo economicus* may invest in their own ‘human capital’ in much the same way as the entrepreneur invests in physical capital. Whilst facing some challenges from proponents of the so-called ‘screening hypothesis’ (Maglen 1990; 1993) and

public choice theorists (see, for instance, Institute of Public Affairs 1990), the theory of human capital (Becker 1964; Mincer 1970) is perhaps the most well recognised and widely used theoretical paradigm in the general field of the economics of education and training. The genesis of the human capital view has long-standing historical roots. Thomas Hobbes's *Leviathan*, originally published in 1658, referred to 'the value or worth of a man' (Hobbes 1968 [1651], p. 151), and Adam Smith in 1776 provided the genesis of what was later to become human capital theory (Marginson 1993, p.32). The upshot of this theory is that, education and training is an important economic and social tool (Becker 1964; Mincer 1993). In essence, it holds that individuals and nations with superior education standards will earn more and enjoy more rapid economic advancement than less well-educated individuals and nations (Becker 1964; Mincer 1993; Blundell, Dearden, Meghir & Sianesi 1999; Piazza-Georgi 2002). Accordingly, a compelling argument exists which favours the public provision of, and investment in, education due to its crucial role in growth, prosperity and the eradication of poverty (Romer 1986; Lucas 1988; Mankiw, Romer & Weil 1992; Marginson 1993; 1999; Quiggin 1999).

Empirical research in this field accords with this theoretical perspective and identifies substantial gains from investment in training for both the individual and the organisation. The prediction that investment in human capital is accompanied by observable economic benefits for the individual has become a stylised fact in the field of the economics of education and training<sup>1</sup>.

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<sup>1</sup> The magnitude of the benefits identified varies, and is influenced by, amongst other things, the competitive conditions of the labour market. For a complete discussion, see Long et al. (2000).

From the firm's perspective, the primary objective of industry demand for education and training is to ensure an adequate supply of appropriately trained workers in order to secure and maintain maximum profits for the enterprise. Firms' 'demand' for training for their workers will be influenced by various situational factors such as workplace culture, economic environment and market structure, along with the incentive structures in the training, recruitment and labour markets (see, for example Cookson 1986; Maurer & Tarulli 1994; Bates 2001). Employers, unlike individuals, do not demand training for their workers' benefit *per se*, but for its relationship to their business strategy (Dessler, Griffiths & Lloyd-Walker 2004).

Studies show that investment in education and training has a positive impact on productivity and that these gains are in excess of those of the individual, but the estimates of the magnitude of this effect vary greatly (see, for example, Bartel 1994; 1995 and Black & Lynch, 1996; 1997). Moreover, some empirical work demonstrates a strong positive link between the employment of graduates and the level of adoption of high levels of technology and innovation by the firm (Bishop 1994).

In short, the literature concurs that there are substantial gains for organisations and individuals from workplace training. Human capital theory also makes a series of predictions about participation in and timing of training<sup>2</sup>.

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<sup>2</sup> Substantial attention within the human capital approach is also given to the relative apportionment of costs of training, and the impact of various market failures, but a full exposition

### ***Timing of education and training***

Human capital theory predicts that most training takes place early in the individual's career (Groot 1997; Long et al. 2000), since an early outlay provides a longer time in which to amortise the investment. In addition, as age (and experience) increases, so do wage rates, and therefore the opportunity cost of investing in human capital increases with age. Thus, investments made earlier have a higher rate of return, *ceteris paribus* (Blundell et al. 1996). Age earnings profiles typically rise steeply at first, and then tend to flatten and eventually fall. Human Capital Theory suggests that this is due to on-the-job training convexity. On-the-job training may be formal or informal, but all forms of training are costly in the sense that productivity of learners is low and represents a choice on the part of the employer to accept lower productivity for the duration of the training in anticipation of higher productivity later (Long et al. 2000). Training, even informal training, involves time commitment on the part of the trainer.

If we accept the imperative for continual up-dating of skills alongside the ageing of the Australian workforce, this prediction is particularly worrisome (Brooke 2003). Substantial government policy efforts have been directed at retaining older workers as a buffer against skills shortages, and insurance against rising pension and health costs (Access Economics 2001, p. xi)<sup>3</sup>. Moreover, as Karmel (2004) argues, substantial government attention has also highlighted the unique potential

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of this is beyond the scope of this paper. For a comprehensive discussion, see Booth and Snower (1996).

<sup>3</sup> These initiatives include changes to superannuation laws to provide a disincentive to early retirement and the abolition of compulsory retirement at a specified age in the Commonwealth Public Service.



of education and training to play a role in addressing some of the perceived problems associated with the ageing population.

### ***Characteristics of education and training participants***

Human Capital Theory also leads us to believe that those who invested most in schooling will also invest most in training (Carp, Peterson & Roelfs 1974; Blundell et al. 1996; Groot 1997; OECD 1999). The evidence clearly shows that earnings differentials across workers with different educational attainments tend to become more pronounced with age. Younger people are more likely to participate in training, as are those who learn quickly and therefore experience lower psychological and opportunity costs. These are characteristics that are likely to have allowed individuals endowed in such a way to complete school and undertake post-compulsory education with a reduced opportunity cost. Thus, Human Capital Theory predicts that those who have already invested significantly in education will also invest in more training. This explains why this group's earnings continue to rise long after their counterparts' earnings taper off. Some writers conceive of this as a form of complementarity between the three components of human capital that is ability, education and training, and experience (see, for instance, Long et al. 2000).

Whilst these theoretical predictions are useful in attempting to understand the training decisions of individual employees, empirical evidence appears to be generally ex post in nature. An alternative possibility lies in the application of a technique known as Choice modeling.

## **Modelling Employee Choice to Train**

One way to examine the preferences of employees in the context of training involves conceptualising the training course as a ‘product’ and offering individuals choice sets where the product attributes vary. These attributes comprise a ‘bundle’ from which consumers derive utility or satisfaction. So, for example, the hypothetical training product may consist of attributes such as the price, the amount of time taken to successfully complete, the type of skills acquired, the transferability of these skills and so on. Participants’ stated preferences are revealed through their choices between the hypothetical products. Experimental choice analysis is used in this instance to investigate the relative importance of factors considered by individual employees in the context of training.

The behavioural basis of choice modelling is random utility theory developed by Thurstone (1927) and extended by McFadden (1974). Random utility theory assumes that the probability of an individual choosing a particular good from an array of goods is dependant on the utility of the good relative to the utilities of other alternative goods. It further suggests that consumers seek to maximise utility when they make choices. According to random utility theory, the utility of a good is made up of an observable component that is a function of a vector of attributes and individual characteristics along with an unobservable error component. Thus,

random utility theory based choice models allow inferences to be made about preferences for choice attributes, based on stated preferences<sup>4</sup>.

Choice modelling draws upon the *homo economicus* assumption, but recognises the restricted nature of the individual's decision process and, despite its experimental nature, more closely approximates a 'real life' choice situation than alternative techniques like traditional or adaptive conjoint analysis. Furthermore, the iterative experimental design process that cumulatively draws on instances of qualitative data collection can accommodate the gathering of information specific to the organisational context. Thus, in-depth interviews and focus groups are commonly employed to inform development of meaningful product attributes and levels. In sum, this approach employs an expanded notion of human agency that largely preserves the rational choice paradigm, but offers the option of adding psychological and social considerations.

## **Experimental Design**

Survey data collection occurred in December 2004, and was preceded by a qualitative design phase that included in-depth interviews and focus groups with participants from varying levels and locations within the organisation. The population consisted of employees of a State Government Department, comprising 1702 employees in various locations around the state. The organisation employs workers under three broad categories: Science, technical and administrative positions. All employees in the population were emailed on the

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<sup>4</sup> For a detailed explanation of the estimation process, see Morrison et al. (1996) or Hensher et al. (2005)

organisation’s intranet. The email included pertinent information about the study, and a link to the questionnaire web-site. There were two versions of the questionnaire, each with eight choice sets<sup>5</sup>. Through these successive choices, participants thereby ‘reveal’ the trade-offs that drive their decisions. The overall response rate was 21.38 percent, although a chi-square test showed that the sample was not representative<sup>6</sup>. The survey gathered socio-economic, psychographic and demographic data in addition to responses to the hypothetical choice scenario on which the choice sets were based. An example of a choice set appears below.

**Table 1: Example of a choice set**

**Would you choose A, B or C?**

	<b>Cost to you (pa)</b>	<b>Leisure hours lost per week</b>	<b>Career impact</b>
<b>Option A</b>	5000	10	Maintain current position
<b>Option B</b>	0	5	Advance in other sector or industry
<b>Option C</b>	No training		

## **Training Models**

Data were analysed using LIMDEP to estimate a multi-nomial probit model<sup>7</sup>. This allows the formulation of indirect utility functions for the choice ‘to train’ and the choice ‘not to train’. All attributes exhibited expected signs and proved significant

<sup>5</sup> An additional experiment examining a formal study product was conducted simultaneously although only data pertaining to the training product is reported here.

<sup>6</sup> The chi square statistic exceeded the critical value of 11.070, necessitating rejection of the null hypothesis. Some response bias was not unexpected considering the topic of the survey. *A priori* expectations would suggest that those with higher levels of education and training might have increased propensity to complete such a survey.

<sup>7</sup> Whilst the multi-nomial logit model has been the most prevalent in studies of this type, attention has recently turned to the use of models such as the probit model, with less restrictive statistical assumptions (Hensher et al. 2005).

with the model fit judged as ‘good’ following Hensher and Johnson (1981). The indirect utility functions estimated for the multinomial probit Training model were as follows:

$$\begin{aligned} V_1 &= \beta_1 \text{ Price} + \beta_2 \text{ Time} + \beta_3 \text{ Career} + \beta_4 \text{ Age} * \text{ASC} & [6.1] \\ V_2 &= \beta_1 \text{ Price} + \beta_2 \text{ Time} + \beta_3 \text{ Career} + \beta_4 \text{ Age} * \text{ASC} \\ V_3 &= C1 + \beta_5 \text{ SCIENCE}. \end{aligned}$$

The utility derived from the choice to train (V1 and V2) was:

$$- = - 0.00030 * \text{Price} - 0.06161 * \text{Time} + 0.79446 * \text{Advance} - 0.02798 * \text{Age},$$

whilst the utility derived from the choice not to train (V3) was:

$$C1 + 0.68328 * \text{Scientist}.$$

The coefficients for the three attributes in the Model are significant at the 1% level or better and have signs which meet *a priori* expectations. The model explains about 22% of the variation in the data which is regarded as adequate for this type of model<sup>8</sup>. An approach to adjudging goodness of fit employed by Lockwood and Carberry (1998, pp. 6-7) and Morrison (2000, p. 23) involves using the unrestricted log likelihood [*Lu*] and restricted log likelihood [*Lr*] of the

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<sup>8</sup> Rho 2 values of between 0.2 and 0.4 are usually regarded as a good fit of the data in choice analysis (Hensher & Johnson, 1981).

model to generate a goodness of fit statistic. This test confirmed the significance of the model<sup>9</sup>.

Put simply, the choice to train was negatively influenced by the product attributes of leisure time forgone and price, and positively influenced by the impact on career attribute. Increasing age was associated with a reduced propensity to train. However, as Hensher et al. (2005) observe, demographic characteristics such as age or science are, in effect, proxies for unobserved attributes, since it is only the attributes that can provide a source of utility (p. 480).

The utility function V3 represents the utility of choosing the ‘no Train’ option and the constant (C1) captures the unobserved utility emanating from not entering the market for training. The coefficient represents the relationship between the variable (scientist) and the propensity to choose the ‘no train’ option<sup>10</sup>. In essence, those who are scientists were more likely *ceteris paribus* to choose the ‘no train’ option from amongst the choice sets.

Model estimation also allows the employment of attribute interactions to shed further light on the behaviour of various sub-groups in relation to the attributes. More specifically, those who were older were more sensitive to increases in the time commitment required, as were those classified as scientists, and managers.

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<sup>9</sup> The significance of parameters is assessed using a  $\chi^2$  statistic calculated using equation 6.2, below:

$$\chi^2 = -2 [Lr - Lu] \quad [6.2]$$

In this instance the chi-square statistic exceeds the critical value of 11.070<sup>9</sup> and the null hypothesis that the model is insignificant is rejected.

<sup>10</sup> The significant variable in this case is SCIENCE, a dummy variable taking the value of one for those employees with position classifications of scientists. The positive sign indicates that this variable is positively associated with the choice of the ‘no train’ option.

These groups were also less likely to choose an option that had a positive impact on their career. Price sensitivity was associated with advancing age and a job classification as scientist. In short, attribute interactions in these models reaffirm the negative influence of age, a classification as scientist, and a management role on the selection of a Training option. Some of these findings in particular are at odds with the conventional human capital approach, and appear to warrant closer scrutiny from the perspective of the organisation.

### **Organisational Implications of the Training Model**

At this point it may be useful to revisit the predictions of human capital theory in relation to the timing of training and the characteristics of those most predisposed to training. In sum, this theory tells us that those who are young and those with highest existing levels of education will be the most likely to train. Clearly, the Training Model estimated here provides broad support for the former prediction, and suggests, by implication that organisational policy might well focus upon manipulating product attributes, in particular time and price, in an attempt to entice further participation of those of advancing age.

However, the proclivity of scientists to choose not to train lies directly at odds with the predictions of human capital theory. These individuals represent the most educated group within the organisation and many scientists possess post-graduate qualifications (47.6% in this sample). As explained earlier, one would expect, *ceteris paribus*, that this would translate to an increased willingness to undertake further training. However, it is likely that there are a number of intervening

factors within the organisation itself, and more specifically its culture, that hinder further uptake by scientists. The observation that scientists are less positively disposed towards training is further illuminated by the qualitative comments from survey participants. For example:

- *Once you have obtained a PhD, there are very few recognised training opportunities available that would be relevant to the job.*
- *I don't need further qualifications to keep my position and they would have little impact on my chance of progression as a scientist.*

It appears that this organisation is much more attuned to the benefits of study due to the scientific nature of its core business which may result in training being seen as the 'poor cousin', and primarily tied to the organisation rather than to their profession. Professionals are distinguished by their intensely felt affiliation with their profession as opposed to their more tenuous allegiance to their employer (Pryor 1990). In other words, it is possible that scientists, in particular, saw participation in training as a matter of organisational rather than professional concern. For instance, one respondent observed that "*senior scientists self-educate as a matter of course (or should!), it just isn't usually formalised*". This commitment does not appear to translate to the case of workplace training. The data appear to reflect a pervading perception within the organisation that, unlike further study, much voluntary training may be simply a 'waste of time'. As one respondent put it:



- *It [training] comes across as 'doing training for training's sake' rather than to improve skills or performance and seems to be more about satisfying the hierarchy's need to be able to say (in their own performance plans, presumably) that they have X numbers of staff undertake X training course.*

This comment ostensibly refers to a perceived gap between the rhetoric of an organisation that purports to value the learning and development of its workers and the reality of its practice. This appears problematic if the organisation aims to improve participation, since those employees directly engaged in the core business of the organisation who are held in highest regard (i.e. scientists) are resistant to the suggestion of undertaking further training. Other workers are likely to wonder at the real importance accorded to learning and development. Martel (2003, p. 11) for example, has found that the role of line managers in encouraging staff to participate is crucial to maximise participation.

### **Concluding Remarks**

The results of this modelling process indicate the overwhelming influence of economic considerations like the amount of leisure time, the price and the impact on careers in the employees' decisions to participate in a training course. Those who are older are less likely to choose any training option. What is surprising is that, in this context, scientists who arguably have, as a group, the highest level of existing educational qualifications were also significantly more likely to choose a no training option. This finding is directly at odds with the predications of human

capital theory. Given the prevalence of this theoretical approach this divergence may be construed to indicate a cultural problem in the way in which training is perceived within the organisation. Moreover, since these scientists are afforded high status within the organisation, this reluctance to train potentially disseminates very powerful negative messages about the efficacy of training to those lower on the organisational ladder. Previous research has clearly demonstrated strong links between the attitudes and behaviours of supervisors or managers and subordinates willingness to participate in training. Despite substantial rhetoric about the importance of learning and development in this organisation, it appears that the reality is somewhat at odds with this purported policy direction. In this organisation at least, training is seen as the poor cousin of higher education, and this is reinforced by the actions of those within upper organisational echelons. This begs the question as to whether the organisation truly values training or not.

## **References**

- Access Economics (2001). *Population, Ageing and the Economy*. Canberra, Commonwealth of Australia.
- Anderson, D. (2004). Adult learners and choice in further education and training markets: Constructing the jigsaw puzzle. *International Journal of Training Research* 2(2): 1-23.
- Bartel, A. P. (1994). Productivity gains from the implementation of employee training programs. *Industrial Relations* 33(4): 411-425.

- Bartel, A. P. (1995). Training, wage growth, and job performance: Evidence from a company database. *Journal of Labor Economics* 13(3): 401-425.
- Bates, R. (2001). Public sector training participation: An empirical investigation. *International Journal of Training and Development* 5(2): 136-152.
- Becker, G. (1964). *Human Capital: A Theoretical Analysis with Special Reference to Education*. New York, Columbia University Press.
- Bishop, J. H., Ed. (1994). *The impact of previous training on productivity and wages*. Training and the private sector: International Comparisons. Chicago, University of Chicago Press.
- Black, S. & Lynch, L. (1996). Human capital investments and productivity. *American Economic Review* 86(2): 263-267.
- Black, S & Lynch, L. (1997). How to compete: the impact of workplace practices and information on productivity, *NBER Working Paper No 6120*, National Bureau of Economic Research, Boston.
- Blundell, R., Dearden, L. & Meghir, C. (1996). *The determinants and effects of work-related training in Britain*. London, The Institute for Fiscal Studies.
- Blundell, R., Dearden, L., Meghir, C. & Sianesi, B. (1999). Human capital investment: The returns from education and training for the individual, the firm and the economy. *Fiscal Studies* March: 1-23.
- Booth, A. & Snower, D. (1996). Does the free market produce enough skills? in Booth, A. & Snower, D. (eds) *Acquiring Skills: Market Failures, Their Symptoms and Policies*, Cambridge University Press, Cambridge, pp. 1-16.

- Brooke, L. (2003). Human resource costs and benefits of maintaining a mature-age workforce. *International Journal of Manpower* 24(3): 260-283.
- Burke, G. (2000). *Investing in the education and training of adults*: 111-114.
- Carp, A., Peterson, R. & Roelfs, P. (1974). Adult learning interests and experiences. *Planning Non-traditional Programs*. K. Cross and J. Valley. San Francisco, Jossey-Bass.
- Cookson, P. (1986). A framework for theory and research on adult education. *Adult Education Quarterly* 36(3): 130-141.
- Curtis, D. & McKenzie, P. (2001). *Employability skills for Australian industry: Literature review and framework development*, ACER.
- Dessler, G., Griffiths, J. & Lloyd-Walker, B. (2004). *Human Resource Management*. French's Forest, Pearson Education.
- Groot, W. (1997). *Enterprise-related training: A survey*. Melbourne, CEET, Monash University.
- Hensher, D. & Johnson, L. (1981). *Applied Discrete Choice Modelling*. New York, Wiley.
- Hensher, D. A, Rose, J. & Greene, W. (2005). *Applied Choice Analysis: A Primer*. Cambridge University Press, Cambridge.
- Hobbes, T. (1968 [1651]). *Leviathan*. London, Penguin.
- Institute of Public Affairs (1990). *Efficiency of States Spending*. Canberra.
- Karmel, T. (2004). *Australia's approach to lifelong learning*, UNESCO International Expert meeting on TVET, NCVER, Bonn.

- Lockwood, M. & Carberry, D. (1998). *Stated preference surveys of remnant native vegetation conservation*. Economics of Remnant Native Vegetation Conservation on Private Property. Johnstone Centre, Albury.
- Long, M., Ryan, R., Burke, G. & Hopkins, S. (2000). *Enterprise-Based Education and Training: A Literature Review*. Melbourne, Report To The New Zealand Ministry Of Education.
- Lucas, R. E. (1988). On the mechanics of development planning. *Journal of Monetary Economics* 22(1): 3-42.
- Maglen, L. (1990). Challenging the human capital orthodoxy: The education-productivity link re-examined. *Economic Record* 66: 281-94.
- Maglen, L. (1993). *Assessing the economic value of education expansion: A preliminary review of the issues and evidence*. Canberra, AGPS.
- Mankiw, N., Romer, D. & Weil, D. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics* 107(2): 407-437.
- Marginson, S. (1993). *Education and Public Policy in Australia*. Melbourne, Cambridge University Press.
- Marginson, S. (1999). Human capital theory and education policy in Australia. *Australian Economic Review* 32(2): 130-144.
- Martel, L. (2003). Finding and keeping high performers: Best practices from 25 best companies. *Employment Relations Today* 30(1): 27-43.
- Maurer, T. & Tarulli, B. (1994). Investigation of perceived environment, perceived outcome, and person variables in relationship to voluntary development activity by employees. *Journal of Applied Psychology* 79: 3-14.

- McFadden, D. (1974). Conditional Logit analysis of Qualitative choice Behaviour. *Frontiers in Econometrics*. P. Zarambka. New York, Academic Press.
- McKenzie, P. (1999). *How to Make Lifelong Learning a Reality*. Melbourne, ACER.
- Mincer, J. (1970). On-the-job training: Costs, returns and some implications. *Journal of Political Economy* 70(5): S50-S79.
- Mincer, J. (1993). *Studies in Human Capital: Collected Essays of Jacob Mincer*. Brookfield, Edward Elgar Publishing Company.
- Morrison, M. (2000). Aggregation biases in stated preference studies. *Australian Economic Papers* 30: 13-32.
- Morrison, M., Blamey, R., Bennett, J. & Louviere, J. (1996). *A comparison of stated preference techniques for estimating environmental values Research report*. Sydney, UNSW.
- OECD (1996). *Lifelong Learning for all*. Paris, OECD.
- OECD (1999). *Training of adult workers, OECD Employment Outlook*. Paris, OECD.
- Piazza-Georgi, B. (2002). The role of human capital and social capital in growth: Extending our understanding. *Cambridge Journal of Economics* 26(4): 461-479.
- Pryor, B. (1990). Predicting and explaining intentions to participate in continuing education. *Adult education quarterly* 40(3): 146-157.
- Quiggin, J. (1999). Human capital theory and education policy in Australia. *Australian Economic Review* 32(2): 130-144.

Romer, P. (1986). Increasing returns and long run growth. *Journal of Political Economy* 94: 1002-1037.

Shah, C., Fischer, J. & Burke, G. (2001). *Information on future jobs and skills*.  
Melbourne, CEET.

Thurstone, L. (1927). A Law of Comparative Judgement. *Psychological Review*.  
34: 273-286.