

Can British Columbia Obtain a Sufficient Supply of Well Qualified Labour Through Recruitment from Other Jurisdictions, Including Jurisdictions Outside Canada?

Overview

The issue of *planning* for an expected skill shortage was addressed in the question scan *Is It Possible to Accurately Forecast labour market needs?* and included articles concerned with forecasting skill shortages and/or using such information to plan for post-secondary access. The objective of this question scan was to examine the issues surrounding the supply of qualified labour in British Columbia.

Applying a broad range of applicable search terms to four major databases initially yielded 385 potentially relevant articles. Subsequent examination of article abstracts reduced the number to 45. A search of government and professional/sectoral organisation websites yielded an additional 9 potentially relevant documents.

An initial review revealed a few articles addressing the concern of producing a sufficient supply of qualified labour and/or supplying the needs through recruitment. Often this literature comprises industry and government reports. Few articles are specific to BC; however, Canadian, US and international articles may be relevant to BC's labour situation.

Some articles analyse current labour needs, and raise concerns regarding the quality, timeliness and effectiveness of institutions in training people to meet these needs. To this end, several reports discuss: trends in today's labour industry; employer concerns in meeting industry needs locally; and, projections of future ability to meet demands through varied training and/or hiring strategies. Other articles focus on economic concerns (e.g., cost of training vs. recruiting).

Literature focused directly on the economics of meeting labour needs through training locally or recruiting from external jurisdictions may be categorized into three types: (1) theoretical models estimating costs and benefits; (2) reports or descriptions of actual labour market costs; and (3) evaluations and/or critiques of labour market strategies.

Observations

Quantitative: 4 Articles – Included in this section are four articles; only one is Canadian. Two studies analyze education and training effects on the workforce: Mak (2000), *The Contribution of Canadian Education to Industrial Production*, provides an analysis of education's economic contribution to the labour market, and Hickman and Quinley (1997) *A Synthesis of Local, State, and National Studies in Work Force Education and Training*. AIR 1997 Annual Forum Paper.

Two studies were conducted to evaluate labour market strategies: Ryoo and Rosen (2004) *The Engineering Labor Market*; and, Brunello and Medio (2001) *An Explanation of International Differences in Education and Workplace Training*.

Qualitative: 2 Articles – Included under this heading are two international studies (USA and UK) discussing labour market strategies:

- Haddadj and Besson (1998) *How US Steel Companies Are Addressing the Skill Shortages that They Meet* is a survey of steel companies which asks if they meet needs through contingent action (recruiting non local labour), passive action (recruiting local labour), or active action (i.e. retraining, restructuring jobs).
- Wainwright (2005) *UK Looks Abroad to Fill Jobs* is a survey that reveals British universities' increasing dependence on overseas academic talent.

Reports: 40 Articles – The majority of articles fell into this category; however, only three examine British Columbia.

- Gallagher (1987) *Community Colleges in Canada: A Current Profile* reports on BC's college involvement in skill upgrading;
- Walker (1992) *Labour Trends and Training Needs in British Columbia* examines market-driven, employer-centered training programs using advanced technologies and traditional on-site instructional methods;
- Yao (1992) *Environmental Scanning Report, 1992* reports on an environmental scan of the social and economic trends in the college's service region that will most likely affect prospective students' educational and training needs.

The remaining 16 Canadian reports may be divided into four categories.

The first category analyses labour market policies and/or trends, for example, Smith (2000) *"Will There Be Enough Excellent Profs?" Report on Prospective Demand and Supply Conditions for University Faculty in Ontario*. The second category argues for investment in education, and training programs that reflect the current or foreseeable needs of the labour market. For examples, see Bergeron and Nakitsas (2001) or Malcomson (2002). A third category evaluates training and economic returns, for example, Beaudet and Senechal (1997). Finally, the last category examines the challenges facing the labour market in meeting the demand for well qualified workers. Kim (1996) *Adult Retraining in Canada: Some Issues* is an example. The remainder of the articles, from the US and abroad also fall into the preceding categories.

Grey Literature: 8 Articles – Included in this section are government produced reports from BC, Manitoba and New Brunswick. These contain information and/or statistics pertaining to a variety of topics. These include:

- labour market policies and trends;
- investment in training;
- evaluation of performances in training and economic returns;
- challenges being faced in the labour market

Summary

More empirical data reflecting (a) the state of qualified labour in BC and Canada, and (b) evaluations of the outcome of training versus recruiting, would be desirable. This scan indicates insufficient quantitative or qualitative literature to inform policy responses to the posed questions. While many reports rely on data available through government or

industry-produced statistics for analysis of trends and performances, and a few reports rely on surveys revealing market responses from either labourers or employers, none of the concerns appear to be systematically researched.

Almost all articles report on technological and global market trends and many articles reiterate the challenges faced by the labour market to meet the new skills and knowledge demands of the 21st century. Reports also indicate that most jurisdictions are more interested in “growing their own labour force” – which meets the needs of their citizens (e.g. reducing unemployment) - than in recruiting from external sources. Nonetheless, a few articles reported on the economic advantages/disadvantages of employment mobility across jurisdictions.

Finally, most institutions that train, retrain or upgrade skills agree that employers are interested in both general and specific skills depending on the demands of employment – and that the market, requiring both, will continue to support varied institutional directions provided such directions create qualified market-relevant workers.

Feasibility

There is not a sufficient base of research, particularly relevant to BC, to undertake a more detailed analysis of the literature.

Appendix A: Included References

References - British Columbia

BC Stats. (2005). *Labour Mobility Study: Does it Pay to Change Jobs?* Retrieved Dec. 9, 2005 from http://workinfontet.bc.ca/lmisi/jointcom/Research/mob3_pub.pdf

This study is a preliminary analysis of job mobility in Canada. Empirical findings on job mobility based on the 1993 Survey of Labour and Income Dynamics (SLID) sample have revealed some trends. Many issues on job mobility remain unexplored due to the limitations of the data. More research is necessary to shed light on the relevant issues of job mobility in the 1990's.

BC Stats. (2005). *Special Feature: A Summary of the Federal Immigration Plan for 2005*. Retrieved Dec. 8, 2005 from

<http://www.bcstats.gov.bc.ca/pubs/immig/imm043sf.pdf>

Canadian immigration policies continue to aim at striking a balance between three major themes: family reunification, economic development and humanitarian/refugee admission. Overall, economic immigrants will still represent the majority of landing; the majority of the economic immigrants to be admitted in 2005 will fall under the skilled worker classes. In the past several years about 60 percent of immigrants who arrived in Canada were economic immigrants.

Gallagher, P. (1987). *Community Colleges in Canada: A Current Profile*. Canada; British Columbia:

An overview is provided of the community college sector of Canadian post-secondary education. The first section points out the characteristics shared by the wide range of institutions termed "community colleges," indicating that: (1) they are public institutions with low or no tuition for conventional full-time students; (2) they are products of provincial legislation and function as components of provincial post-secondary systems; (3) they offer diplomas, certificates, and other credentials, but are not degree-granting institutions; (4) they are known for their diversity of programming; (5) a growing proportion of community college activity involves skill upgrading and retraining of current members of the workforce; (6) admissions requirements differ by program; (7) students tend to be older than university undergraduates; and (8) the colleges are actively involved in the transfer of technology to the workforce. The next section offers brief descriptions of the community college systems operating in each province, noting that in all there are 200 community colleges or allied postsecondary institutions in Canada. The scale of the community college sector is assessed next in terms of enrollments (i.e., approximately 500,000 full-time and over 1,500,000 part-time students); and numbers of faculty, administrative and support personnel, and citizens serving on college boards and advisory committees. The next sections examine college governance structures, relations with the provincial and state governments, and unionization and labor relations within the colleges. Information on funding is provided next, indicating that the community colleges accounted for 9% of the total

educational expenditures in Canada in 1984-85, with the three layers of government contributing 84% of direct college funding. The final sections identify some of the national and provincial organizations for community colleges, and offer conclusions.

Walker, S. P. (1992). *Labour Trends and Training Needs in British Columbia*. Canada; British Columbia:

In an effort to meet the training needs of the British Columbia (BC) labor force, Open College (OC), in Burnaby, has focused future activities on market-driven, employer-centered training programs utilizing advanced technologies and traditional on-site instructional methods. Designed to ensure that these courses and programs reflect actual labor demands, this report examines BC's training needs, details economic and labor market trends and forces, identifies the extent to which training needs have been changed by such factors as industry demands and political developments, and recommends ways in which OC's programs can upgrade the level of skills of the BC labor force. After an introductory section discussing the purpose and methodology of the report, part II provides an economic and labor market overview, detailing information on: (1) a world overview, examining economic trends in the United States, Europe, and Asia; (2) the Canadian economy, reviewing demographics and employment, productivity, trade, and industrial development; (3) the BC economy; (4) provincial industries and industrial development; (5) developments in the workplace; (6) occupations and demand; (7) critical skills; (8) skills shortages; and (9) training trends, examining such areas as expenditures, delivery methods, and governmental role. Part III presents a series of recommendations for OC, emphasizing the need for training in information technology, management and supervision, workplace literacy, and total quality management. Appendixes include a map of BC, a table of government funding for training programs, profiles of the six BC regions, and BC industry profiles by region. An autumn 1992 update on the economic and market overview is attached.

Yao, M. (1992). *Environmental Scanning Report, 1992*. Canada; British Columbia:

In response to the change in the provincial economy from natural-resource-based industries to service-oriented industries, Vancouver Community College (VCC) in British Columbia (BC) conducted an environmental scan of the social and economic trends in the college's service region that will most likely affect prospective students' educational and training needs. Results of the study are presented in this report, which provides data on the following topics: VCC's service area; population and employment trends in the service area; the impact of changing traffic flows on VCC enrollments; the effects of the decreasing 18-34 age group; the impact of other provincial community colleges, the BC Institute of Technology, and universities on VCC enrollment; the impact of social trends and proposed changes in BC's education system on VCC; the impact of the increasing number of immigrants in the region; and operating space needs. Highlighted findings include the following: (1) by the year 2016, the population of Vancouver city will reach 624,406, an increase of 31% over 1992; (2) the student enrollment at VCC is projected to increase by 1% annually for the next 15 years; (3) all postsecondary institutions in the Lower Mainland affect VCC's student intake; (4) the annual employment growth rate in BC

will be about 1.8% in the next 9 years, with increases in service sector jobs such as technology and information services; (5) the population of BC is aging, women's participation in the work force is increasing, and there are greater numbers of single-parent families; and (6) approximately two-thirds (n=19,014 in 1991) of BC's new immigrants require English-language training.

References - Canada

Achieving Excellence: Investing in People, Knowledge and Opportunity. Canada's Innovation Strategy. (2002). Canada; Ontario: Information Distribution Centre.

To become one of the world's most innovative countries, Canada requires a national innovation strategy for the 21st century. It is progressing toward a more innovative economy, but lags behind many developed countries in terms of overall innovation performance. A national innovation strategy to meet Canada's innovation challenge proposes goals, targets, and federal priorities in these three principal areas: knowledge performance, skills, and innovation environment. The public and private sectors in Canada need to address the knowledge performance challenge by creating and using knowledge strategically to benefit Canadians, i.e. promoting the creation, adoption, and commercialization of knowledge. To address the skills challenge, Canada must increase the supply of highly qualified people, thereby ensuring the supply of people who create and use knowledge. Canadians need increased confidence to adopt innovation. To meet the innovation environment challenge, Canada must work toward a better innovation environment; it must build an environment of trust and confidence, where the public interest is protected and market-place policies provide incentives to innovate. These three elements come together at the community level; Canada must stimulate creation of more clusters of innovation at the community level. The government must engage provincial and territorial governments and business and academic stakeholders to contribute to a national innovation strategy.

A Lot to Learn: Education and Training in Canada. A Summary.(1992). *Canadian Vocational Journal*, 27(4), 11-16.

Highlights the main findings of a report of the Economic Council of Canada that looked at education and training systems, labor market performance, and the overall economic performance. Includes the council's proposed educational targets.

Association of Canadian Community Colleges (ACCC). (2005). *The Role of Canadian Colleges and Institutes in Meeting Canada's Professional, Technical and Trade Skills Challenges*. Retrieved Dec. 8, 2005 from

<http://www.accc.ca/ftp/pubs/CollegeCanada-V7-1.pdf>

Canada's growing skills shortage has emerged in recent years as the most serious issue facing its vital manufacturing sector. In the face of burgeoning international competition, our manufacturers are under unrelenting pressure to innovate and improve their productivity. To succeed, they must rely on the skills, flexibility and

ingenuity of their employees. However, a shortage of skilled workers - the result of demographics, coupled with an unfortunate reluctance among young people to choose manufacturing careers - limits the growth of Canadian manufacturers.

Averill, N. (2005). *Recruiting and Retaining the Next Generation of Workers from Colleges and Institutions*. Retrieved Dec. 8, 2005 from http://www.ppforum.ca/ow/smart_workplace_2.pdf

In partnership with the Association of Community Colleges of Canada (ACCC) and the government of Canada (Human Resource and Skills Development), the Public Policy Forum recently undertook an on-line survey of community college students of Canada. The main purpose of the survey was to assess college and institute students' interest and motivation in working for the federal public service. The survey also provides insights on college and institute students' perspectives on future career choices and preferences, the skills they gained at college and preferred job search strategies.

Beaudet, G., & Senechal, G. (1997). *Survey of Trends in Adult Education and Training in Canada (1985-1995)*. Report of Canada in Preparation for CONFINTEA V. Canada; Ontario:

Between 1985 and 1995, the progress of adult education in Canada was largely influenced by the restructuring of the economy and the job market; the changing nature of the state; the media and new information and communication technologies; and social and cultural change. Adult participation in education and training increased from 19 percent in 1983 to 28 percent in 1994. These were priority areas: job-related training; those who receive government assistance; customized training; literacy and basic education; and life and work. Awareness of the nature of literacy grew, and involvement in promoting literacy grew significantly. Advances in areas such as access to postsecondary education and lifelong learning showed how training and adult education can create greater equality among persons and groups in relation to the development of Canadian society. A considerable volume of adult education and its funding occurred under federal and joint federal-provincial jurisdiction as labor market, literacy, and vocational training. Corporate, community, trade union, and the private sectors were also involved as were libraries, museums, and community centers. Fields of intervention were equal opportunities for women; citizenship, environment, health, and democracy and the information highway; international cooperation; cooperation between industrialized countries; cooperation for development; and training programs. Lifelong learning is a key for entering the next century.

Bergeron, F., & Nakitsas, G. (2001). *How To Collaborate through the Ups and Downs in Our Economy? A Successful College/Cegep/Employer/Union Partnership in the Steel Industry. An Association of Canadian Community Colleges Sponsored Sectoral Case Study*. Canada; Ontario:

This study reviews the relationship that has been established in the steel industry between the Canadian Steel Trade and Employment Congress (CSTEC) and education/training institutions called upon to provide steelworker job training and

development programs. It describes the forces that brought the parties together and the difficulties in forming and maintaining this relationship. Finally, it outlines the lessons learned and highlights the important role government plays in supporting these partnerships. The paper opens with a brief introduction of the historical context that fostered collaboration between CSTECC and colleges. It then offers a discussion of the three human resource challenges (worker adjustment, skill training, and entry-level programs) that served as the foundation for the partnership. The authors conclude the paper with a presentation of the six key insights that emerged during the study, three of which are: (1) it is important that all parties are addressing a common goal or challenge; (2) it is important to recognize that, while the goal or challenge is common, the needs of each of the parties will invariably be different; and (3) governments need to play a critical role in both the initiation and sustainability of these partnerships between industry and education/training institutions.

Blaney, M. & Bard, R. (2005). *Annual Report of the Department of Training and Employment Development (TED), New Brunswick*. Retrieved Dec. 8, 2005 from <http://www.gnb.ca/0105/AnnualReport-rapportannuel05.pdf>

The annual report addresses the following vision and values: New Brunswickers have the right skills, the right jobs and the right balance to gain economic prosperity for themselves and for the province. In light of this value statement, TED ensures the New Brunswick workforce is competitive by making strategic investments in people through innovative programs, services and partnerships. The report includes evidence that the values and goals (vision) are aligned.

Canada Employment and Immigration Commission, Ottawa (Ontario). (1990). *Success in the Works: A Profile of Canada's Emerging Workforce = Le nouveau mode d'emploi: Profil de la croissance du marche du travail*. Canada; Ontario: Public Inquiries Centre.

This study, in English and French, analyzes the trends emerging in labor demand and supply in Canada, and examines the challenges to preparing an adequately trained and prepared workforce. The economy and the labor force seem to be developing along divergent paths, creating a potential gap between the flexibility and skills of workers and the skills demanded by the economy. Canadian industry is making significant capital investments in the technology, equipment, and machinery required to compete in a global market but is neglecting to invest in the education and employee training and skills needed to benefit from technology. Such human investment is essential to help workers and their employers respond to new economic conditions that are transforming the kinds of jobs available. At the same time, the labor force is becoming older and less adaptable to change. Young people looking for jobs will need a higher level of basic and entry-level skills and the existing workforce must absorb new demands for skills and work patterns. Even greater effort will be required to provide educational and employment opportunities for women, older workers, aboriginal peoples, visible minorities, and the disabled.

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Danis, F., & Lecoupe, F. (1991). *The Need for Training: A Synthesis of Recent Studies. Report 90-17*. Canada; Ontario:

An analysis and summary of 19 recent Canadian and U.S. reports on training needs show that all of them warn that Canada (like North America generally) is facing a serious skills crisis at a time of growing demand for capable workers. In addition, the studies point out that the private sector must contribute much more than it has so far to human resource development. The conclusions drawn from the analysis were intended to guide TVOntario in developing skills programming and a long-term skills plan for all sectors. Six target groups were identified, and their learning needs were categorized according to general literacy, communication, awareness, personal and health issues, management, and human resource issues. Eight specific areas in which TVOntario could become involved to fill gaps or provide alternatives to current skills training were identified: (1) generic skills programming; (2) direct industry-specific teaching; (3) technological awareness; (4) interpersonal skills; (5) public awareness; (6) prevention; (7) programming to provide options and choices; and (8) narrowcast programming (for example, programming directed to women or other special groups).

Kim, K. S. (1996). *Adult Retraining in Canada: Some Issues*. Canada; Newfoundland:

Canada has traditionally supported a high level of unemployment benefits and retraining programs for its displaced workers. From the 1960s onward, legislation and attitudes in the business community have been geared toward retraining of workers for high-tech workplaces and the replacement of low-skill jobs with high-skill jobs. With increased globalization of industries, businesses found that they needed fewer numbers of highly trained workers. Downsizing and restructuring

resulted in high rates of unemployment. At the same time, increasing pressure to reduce the national deficit and a swing toward more pro-business policies under the Mulroney government resulted in less support for unemployed persons and less money for retraining. Instead, emphasis was placed on quick reemployment at any available job in order to reduce the economic burden of worker support and training. Even budgeted funds that had been designated for the Canadian Job Strategy were not spent on retraining. As shown by the problems in the Nova Scotia fishing industry, however, even when retraining efforts were substantial, only about half the eligible workers took advantage of them. Those who were retrained were by and large younger, more educated, and male, whereas older, less educated workers and married women were less visible in retraining programs. These workers perceived that, even if they retrained, they were unlikely to gain employment in their own communities and were unwilling to move and to compete with younger, better-educated workers. These trends affect not only Canada but all countries when globalization is an ongoing phenomenon.

Leach, J. (1996). Training, Migration, and Regional Income Disparities. *Journal of Public Economics*, 61(3), 429-43.

It is assumed that there are two regions, that production requires both skilled and unskilled labor, and that one region is innately more productive than the other. Workers, who differ in their migration or training costs, make individually rational decisions. In equilibrium, the ratio of skilled workers to unskilled workers is always higher in the more productive region. Average incomes differ between regions because regional differences in wage rates are reinforced by regional differences in the structure of employment. The model is also used to analyze the effects of policies intended to equalize the distribution of income.

Mak, K. (2000). The Contribution of Canadian Education to Industrial Production. *Education Economics*, 8(3), 249-257.

Examines education's influences on Canada's employment, wages, and industrial production, using 1990 cross-sectional, provincially grouped statistical data. Workers disaggregated by educational attainment are substitutes for one another. Capital and all labor groups disaggregated by education are complements. Earnings differentials between better- and less-educated workers remain constant regardless of supply.

Malcolmson, L. (2002). Workplace Learning: The Role of Canadian Colleges and Institutes in Meeting Canada's Professional, Technical and Trade Skills Challenges = L'apprentissage en milieu de travail: Le rôle des collèges et instituts canadiens face aux défis canadiens en matière des compétences professionnels et techniques. *College Canada*, 7(1)

This issue examines selected topics in vocational education in Canadian community colleges. It focuses on the central themes of community college and industry partnerships, vocational education assessment, and vocational and workplace education pedagogical models. Articles include: (1) "Industry and Colleges: Key Partners in Meeting Canada's Skills Challenge," by Perrin Beatty, which examines

the increasing demand for Canadian community colleges to supply readily employable, skilled workers and the challenges in finding more effective partnerships to increase efficiency between industry and education; (2) "TOWES [Test of Workplace Essential Skills]," by Conrad Murphy and Michael Herzog, which looks at the TOWES and its value as an educational and industry assessment tool; (3) "Workplace Education That Works," by Donna Allan, which is a report from Lethbridge Community College about its programs and services in vocational education; (4) "It's not Rocket Science-but Someone Has to Fix the Space Shuttle," by Michael Kidney and Sue Boutlier, which looks at the ways in which community college vocational education instructional programs can work effectively with private partners to increase student learning outcomes; (5) "GM-Niagara College Partnerships: An Evolution from Training to Learning," by Bea Clark, which chronicles the development of a partnership between General Motors (GM) of Canada and Niagara College; and (6) "Applied Research Transfer to the Workplace through Training and Learning-A Brief Example," by Chantale Perreault, which summarizes findings from a case study of how a new degree program can increase the quality of a vocational education program.

Manitoba Government. (2005). *High Demand Occupations in Manitoba*. Retrieved 12/08, 2005 from http://www.edu.gov.mb.ca/aet/docreports/hdo_en_2005.pdf
This report identifies occupations that are currently in high demand in Manitoba and are expected to be in high demand over the next two years. High demand occupations are those that employers are likely to have difficulties in filling. These usually involve a lengthy training period, which prevents rapid adjustment of supply to demand. A few occupations are included because of active recruitment. High demand skills can either be generic to many occupations or specific skills that are required for certain occupations.

Manitoba Government. (2005). *Manitoba Training and Education Summit*. Retrieved Dec 8, 2005 from http://www.edu.gov.mb.ca/aet/docreports/Summit_Report_Dec-01_Eng_ver1.pdf
In March 2000, the Manitoba Century Summit brought together 120 Manitobans from throughout the province who represented large and small business, labour, government and community associations. "Workforce Development" theme has been addressed and showcased two initiatives from the Departments of Education, Training and Youth and Advanced Education. The main goal, to elicit feedback on the two initiatives answered the question: "Do the Manitoba Training Strategy and the College Expansion Initiative assist the province in developing a skilled and educated workforce?"

Manitoba Government. (2005). *Skill Investments for All Canadians: The Future of Labour Market Development Agreements (LMDA)*. Retrieved Dec. 8, 2005 from [http://www.edu.gov.mb.ca/aet/docreports/EI-LMDA-PAPER-\(English\)-Jan30-02.pdf](http://www.edu.gov.mb.ca/aet/docreports/EI-LMDA-PAPER-(English)-Jan30-02.pdf)
Certain traditional jobs and industries are disappearing while new ones are rapidly evolving. Rapid progress in technology is creating a competitive global

marketplace, and increasing the education and skill levels workers need to maintain employment. An estimated 25 percent of Canada's overall growth in per capita GDP from 1960-1995 was accounted for by the growth in the knowledge and skills of workers. The Canadian labour market is in transition - the challenge is to stay current. A number of members of the Organization for Economic Cooperation and Development (OECD) have found that investment in active labour market programs, offer a substantial return on investment.

Manitoba Government. (2005). *A Statistical Profile of Education and Training in Manitoba*. Retrieved Dec. 8, 2005 from http://www.edu.gov.mb.ca/strategy/statprofile_04.pdf

A statistical profile of elementary, secondary and postsecondary education; adult education and training, including workplace essential skills programs and vocational institutions. Report includes overview of labour force, enrollments, operating and employment costs.

McMullen Kathryn, & Schellenberg, G. (2003). *Skills and Training in the Non-Profit Sector. CPRN Research Series on Human Resources in the Non-Profit Sector No. No3*. Canada; Ontario:

Training in Canada's nonprofit sector was examined through a review of data from Canada's Workplace and Employer Survey, which collected data from a nationally representative sample of Canadian workplaces and paid employees in those workplaces. Overall, 61% of employees in nonprofit organizations considered a postsecondary credential necessary to do their job (versus 36% of employees in the for-profit sector and 70% in the quango sector, which was defined as nonprofit organizations in "quasi-public" industries). About half of employers in the nonprofit and for-profit sectors reported increases in skill requirements since beginning their current jobs. Employers in all three sectors rated the importance of increasing employee skills highly. Nonprofit organizations were more likely to provide training for their employees than for-profit organizations were. Training in the for-profit sector was more likely to consist of on-the-job training. Women and employees aged 35 or older in the nonprofit and quango sectors were much more likely than their for-profit counterparts to have received training in the previous year. Thirty-six percent of employees in the nonprofit sector and 38% in the quango sector stated that they received too little training for the demands of their job (versus only 27% of employees in the for-profit sector).

National Literacy Secretariat, Ottawa (Ontario). (1990). *Creating a Learning Culture. Work and Literacy in the Nineties. Based on the Report, "Workforce Literacy: An Economic Challenge for Canada," by the Hudson Institute*. Canada; Ontario:

Technological change and other innovations affect the way Canadians work. These changes demand increasingly higher levels of literacy for today and for the future. Basic skills are not enough. A low level of schooling is associated with higher unemployment. People who invest in their own higher education are likely to reap the reward of higher income. Although school credentials are important, the most important skill for workers is "learning to learn." Companies must start to train, not

merely buy, skilled labor. In the nineties, more service and manufacturing skills that require continuous training in new technologies mean that a good education will be the minimum requirement for new workers to get rewarding jobs. New technologies will be created over the next 10 years, and current technologies will be improved. Other trends are as follows: computer literacy will become a key part of workplace literacy; robots will be able to do more; communication technology will play a growing role in daily life; and advances in energy production could change the way people work. Industries are using technology and other innovations to compete for new markets worldwide. Countries with the best educated and best trained work forces will prosper in a world more reliant on brains than muscle. Canada's labor force will have a new look with more women and older workers. Employers will have to invest in workers, and Canadians must create a learning culture.

Press, H. (1997). *Teacher Demand in Canada. A Report on the Teacher Labour Market*. Canada; Ontario: Ontario Institute for Studies in Education of the University of Toronto.

This report summarizes findings from a national survey to gather information about current and future demand for teachers in Canada and to identify underlying policy concerns. The Teacher Demand survey was conducted with a sample of school districts in all provinces and territories and in both official languages. The survey contained 18 questions covering a broad range of issues, beginning with specific examinations of student enrollment and employment trends and ending with general inquiries into policy requirements. Respondents were asked about current teacher requirements and priorities and about teacher attrition and recruitment. There were 136 usable questionnaires, for a response rate of 67.7 percent. Results indicated a trend from a chronic teacher shortage to a perpetual surplus. However, there were still problems recruiting highly qualified individuals to rural and remote areas. There were projected teacher shortages due to the quality of teacher graduates, the match between vacancies and available recruits, the level and pace of student enrollment change, immigration policies, the nature and extent of interprovincial migration, resource allocation policies, teacher opportunities (e.g., early retirement), and teacher turnover rates due, in part, to an aging teacher labor force. Many respondents noted that current government reforms and revisions to teacher education programs are already resulting in a greater balance between supply and demand. Among the priorities identified by school districts, the most frequent response was technology education.

Sharpe, A. (1999). *Apprenticeship in Canada: A Training System under Siege? Second Draft*. Canada; Ontario:

This discussion draft reviews trends in Canada's apprenticeship system over the last 20 years and then examines prospects for labor market conditions for Canada's total economy and for the construction sector to the year 2005. The apprenticeship system has a number of serious weaknesses, including the following: (1) the stagnation in new apprenticeship registrations in the 1990s, in contrast to increased enrollment in other postsecondary programs; (2) the inability of the apprenticeship system to expand beyond traditional fields; (3) the inability of the apprenticeship system to

increase the extremely low proportion of women (3 percent) enrolled in apprenticeship programs; (4) the uneven development of apprenticeship programs by province; (5) the very low level of completion rates for apprenticeship programs (9.5 percent); and [6] the strong downward trend in apprenticeship completion rates, declining one-third over the past 2 decades. The trends raise serious questions about the ability of the apprenticeship system in Canada to produce an adequate supply of qualified workers for the economy. Attention should be focused on the reasons why Canada's apprenticeship system appears unable to get its apprentices to complete their programs in a timely manner, if at all; why the system has not expanded outside traditional occupations; and why women are not attracted to apprenticeship programs.

Smith, D. C. (2000). *"Will There Be Enough Excellent Profs?" Report on Prospective Demand and Supply Conditions for University Faculty in Ontario* No. COU673). Canada; Ontario:

Secondary school reform in Ontario is expected to produce an increase in enrollment. An estimated 4,500 new faculty will be needed to meet this increase. In addition, 5,500 new faculty will be needed to fill openings resulting from retirement. This report's major findings indicate that: 1) Faculty are the crucial factor in determining the quality of education and research contributed by universities; 2) A strong rise in demand for new faculty is expected through the first decade of this century, and this rise will create an enormous challenge and opportunity; 3) The university sector in Ontario has limited capacity to meet increased enrollment; 4) Improved graduate support is needed; 5) Higher demand for faculty parallels similar needs internationally, therefore hiring barriers should be decreased; 6) Three sets of factors affect faculty retention and recruitment efforts; and 7) Recommendations are made for sharing responsibility among stakeholders for meeting the challenge of higher enrollment in terms of faculty needed.

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Building a Digital Workforce. Part 1: Raising Technological Skills. NPA Report(2001). No. No303). U.S.; District of Columbia: National Policy Association.

A digital divide, a chasm between those with access to technology and training, particularly workplace information technology (IT) skills and those without, threatens the economic prosperity of American workers and America's competitiveness. The most effective way to reduce digital disparities is to improve the education and training of the existing workforce. In response to challenges to America's continuing competitiveness, productivity, and workforce employability, the Digital Economic Opportunity Committee (DEOC) was formed to expand the digital workforce by identifying ways to broaden the base of workers with technical skills and to raise the technical skills of the existing workforce. DEOC defined IT workers and found that, in effect, virtually every worker in the new economy is an IT worker or an IT-enabled worker (uses computers to perform job functions). It

viewed the issue as a skills gap, not a worker shortage. DEOC believed the appropriate response to this skills gap is two-fold. The first was upgrading existing worker skills through training. Issues were basic training needs, capacity, funding, and responsibility for training. DEOC's solutions for building a digital workforce were to identify skill sets needed for each IT job category, along with principal paths to job entry and for job advancement, and to define a lifelong learning system.

Berryman, S. E. (1988). *Education and the Economy: A Diagnostic Review and Implications for the Federal Role*. U.S.; New York:

Changes in the American economy and in the nature and organization of work fundamentally challenge the educational system and have implications for the Federal Government's role. Case studies of the insurance, banking, and textile industries demonstrate the following changes in the nature and structure of work: (1) both service and manufacturing industries are moving from a production orientation to a product and customer orientation, from mass production to flexible production; and (2) computerization usually increases skill demands. The following disconnections between education and the economy are discussed: (1) mismatches between school and non-school settings in the structure of knowledge used and the social structure of its use; (2) differences between employers' and educators' perceptions of problems; (3) problems with the signalling systems between school and work settings; and (4) organizational differences between schools and industries. The following economic changes that affect post-secondary education and training are discussed: (1) conflict between labor demand and supply; (2) employers' training investment patterns and their consequences; and (3) changing patterns of employer training investment. The following recommendations for the federal role in education are discussed: (1) reconceptualize the federal role in education; (2) lead efforts to revitalize education; (3) invest in educational research and development; (4) eliminate narrow job-specific vocational education at the secondary level, integrate academic and vocational learning, and extend this integration through the elementary grades; (5) unify education and training policy; and (6) think through a policy on training vouchers for workers.

Brown, B. L. (2002). *Global Mobility of Workers. Trends and Issues Alert No. No35*. U.S.; Ohio:

Changes in the world economy such as globalization, free trade in services, and unequal demand for some occupations have resulted in increased cross-national movement of workers and emphasized the need for easily transferable or international qualifications. Leading the effort to address the issue of transferable qualifications is the European Union (EU), which introduced a community vocational training policy to support the free movement of workers across borders and to facilitate the acquisition of skills for transnational employment. The international movement of workers has implications for corporate and national training systems that prepare individuals with qualifications that ensure their employability. The rapid turnover in technology requires continual updating of technical skills and emphasis on skills of adaptability, unlearning old things, and learning new ones. These skills are difficult to teach in a normal classroom situation

and require a new pedagogical approach. These are obstacles to mobility that cannot be resolved through renewed education and training practices: the potential for unemployed citizens to lose the right to unemployment benefits and social security if they move across borders; difficulty with obtaining housing in the host country; and cultural barriers.

Conrad, C. A. (1999). *The American Workforce in the New Millennium: The Growing Demand for Skills. A Report from the Joint Center's 1999 Corporate Forum*. U.S.; District of Columbia:

To explore the roles that government, business, and community institutions might play in ensuring that African Americans get the job training they need to be competitive in the 21st century, the Joint Center for Political and Economic Studies invited U.S. Secretary of Labor Alexis Herman to meet with representatives of the business community. Forum participants also heard from Albert Siu, human resources vice president for education and training at AT&T and Margaret Simms, the Joint Center's vice president for research. Secretary Herman reviewed the current situation for job skills and employment for African Americans and indicated that the profile of the workforce has shifted toward technology without the necessary investments to improve the skill levels of workers. Secretary Herman also reviewed recent federal and private sector initiatives aimed at job skills training. Dr. Simms pointed to federal school-to-work initiatives as evidence of a change in attitudes in the United States about the role of the private sector in educating the next generation of workers. Dr. Siu explained how investments in worker training pay off for the employer and cited advantages of electronic learning technologies for worker training.

Haddadj, S., & Besson, D. (1998). How US Steel Companies Are Addressing the Skill Shortages that They Meet. *Journal of European Industrial Training*, 22(7), 301-308. A survey of 350 U.S. steel companies found the use of three approaches to skill shortages: contingent action (recruiting nontraditional or nonlocal workers, incentives for referrals); passive action (recruiting through job fairs, private industry councils, government agencies); or active action (retraining, restructuring jobs, raising entry-level salaries). Only a minority use the active approach.

Hickman, R. C., & Quinley, J. W. (1997). *A Synthesis of Local, State, and National Studies in Work Force Education and Training. AIR 1997 Annual Forum Paper*. U.S.; North Carolina:

This study investigated what the workforce education, training, and retraining needs of businesses and organizations in the United States are, and how well community colleges are meeting these needs. Conventional and meta-analytical methods were employed to analyze a sample of 10 local, state, and national studies in workforce development with a secondary analysis conducted for the purpose of quantitatively and qualitatively integrating the findings. Content analysis methods were used to provide an analysis of survey comments and other qualitative data in the studies. The results of the synthesis supported two general conclusions: (1) community colleges are responding to the needs for workforce education and training for all types and

sizes of business and for specific training needs; and (2) they are meeting the needs of business by providing customized, high quality, flexible workforce training programs. Additional research is suggested to validate the extent to which employers across the country agree in their perceptions about work force development needs and issues and there should be a systematic exploration of the agreement of the perceptions of employers and community college administrators concerning the central issues in workforce development.

Information Technology Association of America, Arlington, VA. (1997). *Help Wanted: The IT Workforce Gap at the Dawn of a New Century*. U.S.; Virginia:

The supply of and demand for skilled information technology (IT) workers were examined in a survey of sample of 1,000 medium/large IT companies and 1,000 medium/large non-IT companies that were selected randomly from a Dun & Bradstreet database. A total of 271 companies (149 IT and 122 non-IT companies) responded. Among the main findings/conclusions were the following: (1) approximately 190,000 positions for skilled IT employees are currently unfilled, which translates into 1 vacancy for approximately every 10 IT employees; (2) 82% of large and mid-size IT companies expect to increase their number of IT employees; (3) 71% of respondents believe the demand for IT workers is higher than for other skilled /trained workers; (4) 68% of IT companies cite a lack of skilled /trained workers as a barrier to their ability to grow; (5) increased recruiting and training efforts are, at best, a partial solution to the current difficulty of finding/retaining skilled IT workers; (6) education will be a key facet of any solution to the problem; and (7) both outsourcing of IT work to companies overseas and IT workers' salaries will likely increase.

Lerman, R. I., McKernan, S., & Riegg, S. (1999). *Employer-Provided Training and Public Policy*. U.S.; District of Columbia:

The following are expectations about employer-provided training: (1) the incentive to provide general training arises largely because of transaction costs in the labor market, despite adding value to a worker's productivity when working for a range of employers; (2) employers sponsor training in specific skills since they are likely to reap the benefits of the productivity gains; and (3) firms trying to achieve high levels of technical change are most likely to invest in training. Data have been compared on the incidence and intensity of employer-provided training from the 1997 National Employer Survey, 1995 Survey of Employer-Provided Training, and 1995 National Household Education Survey. Findings indicate about 70 percent of establishments provide some form of formal training and 35-65 percent of all workers receive formal training. Some evidence is found for the commonly cited result that workers with higher levels of education and higher earnings receive more training, but intensity of training is higher for young, part-time, and less-experienced workers. Implications are that: (1) many workers receive employer-provided training; (2) some receive intensive training; and (3) if all training were left up to the private sector and the private sector training patterns continue, training gaps would widen between highly-educated and less-educated workers.

Lindquist, V. R. (1991). *Trends in the Employment of College and University Graduates in Business and Industry. The Northwestern Lindquist-Endicott Report, 1991. Forty-Fifth Annual Report: A National Survey of 320 Well-Known Business and Industrial Organizations*. U.S.; Illinois: Northwestern University.

This report presents survey data, collected from 320 companies, concerning personnel practices and policy related to the employment of college and university graduates. Economic questions specific to the respondents and topical questions of general interest are also presented. The number of companies hiring graduates in 10 bachelors' level and 6 masters-level fields are presented. Among the findings are: (1) that 40 percent of the corporations will increase their hiring at the bachelors level, and 42 percent will be reducing hiring goals; (2) that engineering demand is up 1 percent, while other majors are down 25 percent; and (3) that while 38 percent of the corporations will visit fewer campuses, 24 percent will be on more campuses talking to larger numbers of graduates. In addition, it is reported that salaries for the new graduate are being raised overall by 4 percent. Specifically, engineering salaries for bachelors and masters degrees are up by 4.4 percent, and the computer science master degree major is improving by 5.4 percent. It is noted that employers value the ability to use the personal computer for analysis and other functions, that this demand is growing faster than expected, and that this skill will be utilized throughout one's professional career. Finally, it is reported that the monies and time now spent to screen or qualify an applicant continues to grow.

National Alliance of Business, Inc., Washington, DC. (2001). Corporate Training Delivery: Dollars and Sense. Unconventional Wisdom. *Workforce Economics*, 7(1), 7-11.

With accelerating technology in the workplace, worker training has become a key component of almost every corporation's long-range strategic plan. Almost all companies provide some form of training in computer operations to new and existing employees, and more than 90 percent of companies also provided a range of management, leadership, and communications training to employees in 1999. In addition, more training is being outsourced to outside vendors, and more companies are partnering with outside vendors, such as community colleges, to develop joint training programs that address specific needs. In addition, workers are increasingly receiving training by alternative means, such as the Internet. While quantity of training increases, costs for training workers are also going up. The American Society for Training and Development (ASTD) placed the annual total at 2 percent of payroll, or \$63 billion, in 1999 for companies with more than 50 workers. The actual cost of training may be far higher, however, when costs such as lost productivity while workers are in training are included. However, the cost of not training workers is potentially much higher, because the changing qualifications of the workplace demand that workers maintain competency. Worker training has become as much a part of a company's budget as equipment and building purchases and leases. It represents an investment in the company's future and provides immediate returns via higher profits and improved earnings for both companies and employees, as well as helping to maintain a competitive U.S. economy.

National Alliance of Business, Inc., Washington, DC. (1999). Demand for Skills Spurs Market To Manage Workforce Pipeline. *WorkAmerica*, 16(7), 1,4-5.

Knowledge supply chains are market-driven, competency-based systems in which education and training are aligned to help employers, educators, workers, and students navigate more effectively in the global economy. Three key trends warrant attention in today's global economy: (1) knowledge and skill needs are escalating and changing rapidly; (2) increasingly, knowledge "consumers" (mostly employers) and knowledge "suppliers" (mostly educators and trainers) are working together to improve coordination of the organizations that develop talented professionals; and (3) by managing the knowledge supply chain, employers, educators, and trainers are aligning education and training into a market-driven competency-based system. In the emerging knowledge supply chain system, education and training are increasingly pegged to high standards. The nation's current workforce development system is driven largely by government funding, social goals, institutional roles, political preferences, and isolated programs such as school-to-careers, welfare-to-work, and vocational education. The 1998 Workforce Investment Act provides a window of opportunity to reshape this disjointed system into a market-driven, competency-based engine of talent development. Public-private partnerships must be increased, and the workforce development system must be reoriented from "pushing" people from schools into the labor market to "pulling" people with both general knowledge and the right skills from schools attuned to business needs.

Plewes, T. J. (1992). *Workforce Trends, Workplace Trends: How They Dictate a Changing Education and Training Strategy*. U.S.; District of Columbia:

Four trends will alter the way the education and training system and other human resource agencies will do business. Themes that reflect them are captured in four words: flexibility, quality, diversity, and scope. The reaction to the current economic downturn remains one of flexibility. Flexibility has emerged as the way in which employers look at the work force. Temporary help is the most visible of flexibility practices; others are contracting out, employee leasing, home-based work, and self-employment. Other evidence of a just-in-time work force are hours, compensation practices, and benefits. U.S. companies still in business know about quality and are more and more concerned about the quality of their workers. The message is that quality is tied to survival in the marketplace, work force preparation, the education and training system, and government-business cooperation. The United States is faced with a set of demographic imperatives that spell an increasingly diverse work force: an aging work force, increasing feminization, and a growing minority share. The basic driver transforming the face of industry is the continued shift from goods to services. A new emphasis on downsizing changes temporary situations into permanent reductions in job prospects. These themes provide the challenge: to focus on the future but not to the exclusion of fixing today's problems and to design institutions to meet the challenge in a way that ensures the flexibility so important to growth.

Ryoo, J., & Rosen, S. (2004). The Engineering Labor Market. *Journal of Political Economy*, 112(1), 110.

This paper develops a dynamic supply and demand model of occupational choice and applies it to the engineering profession. The model is largely successful in understanding data in the U.S. engineering labor market. The engineering market responds strongly to economic forces. The demand for engineers responds to the price of engineering services and demand shifters. More important, supply and enrollment decisions are remarkably sensitive to career prospects in engineering. Also a rational model, in which students use some forward-looking elements to forecast future demand for engineers, fits the data reasonably well. These findings suggest that subsidies to build technical talent ahead of demand are misplaced unless public policy makers have better information on future market conditions than the market participants do.

Salzman, H., Moss, P., & Tilly, C. (1998). *The New Corporate Landscape and Workforce Skills: What Firms Want; How They Get It; and the Role of Education, Training and Community Colleges* No. NCPI207). U.S.; California:

This paper presents two policy issues related to the topic of workforce preparation. While changes in the structures and requirement of jobs in the postwar economy have created a need for a more skilled workforce, at the same time, corporations have become increasingly reluctant to invest in training and education for youth and for their own employees. This study examines how such structural changes affect the skills required of workers and the extent to which firms help develop those skills. The authors conducted case studies to learn the corporate restructuring process, how the process impacted workforce skill levels and development, ways that firms developed the skill levels of their workers, and what the resulting implications are for skill development strategies and public policy. The industries chosen for the study were insurance companies and the medical imaging equipment industry, representing service and manufacturing. Among the study's findings is that employers now hire on the basis of a person's ability to master a set of skills, rather than on the basis of existing skills. The study comes to the conclusion that encouraging community colleges to play a central role in workforce development poses perplexing issues. Demand-driven solutions for low-level workers and overall educational improvement strategies that depend on demand-side drivers may need to be carefully constructed and targeted rather than widely expanded as the natural extension of high school.

Tsang, M. C. (1997). The Cost of Vocational Training. *International Journal of Manpower*, 18(1-2), 63-89.

Discusses the methodological issues in costing two common types of vocational training programmes: institutional vocational training and enterprise-based vocational training. Points out that the survey/interview approach should be used to collect data from institutions instead of from the government in costing institutional vocational training, and that more frequent use should be made of the case-study and survey methods in costing enterprise-based vocational training. Based on empirical studies on both developed and developing countries, analyses the costs of different

types of vocational training programmes. Shows that training costs are influenced by such factors as the technology of training, teacher costs and their determinants, programme length, extent of wastage, extent of underutilization of training inputs and scale of operation. In general, vocational/technical education is more costly than academic programmes and pre-employment vocational training is more expensive than in-service training. Discusses the implications of these findings for training policies.

Vaughan, R. J. (1989). *New Limits to Growth. Economic Transformation and Occupational Education*. U.S.; California: NCRVE Materials Distribution Service. The roles played by occupational education in the U.S. economy are changing. Because of the growing demand for and shrinking supply of skilled workers, economic success--of the nation and of individual members of the work force--is increasingly tied to educational and occupational attainments. Unless the nation increases its investment in educating and training noncollege-bound students, it faces two grave risks: overall economic growth will slow and unskilled workers will suffer diminishing economic prospects. The nation's economic success in the coming decades will depend on how well it meets, with investments in human capital in the classroom or on the job, the following imperatives that are raising the demand for skilled workers: (1) the technological imperative; (2) the trade expansion imperative; and (3) the entrepreneurial imperative. Occupational education is a way to get a job, leads to on-the-job training, leads to careers, fosters entrepreneurship, is an avenue to opportunity for the economically disadvantaged, and increases the flexibility of the economy by retooling the work force when existing skills and industries become obsolete. Annual U.S. investments in human capital already equal its investments in plants and equipment and exceed any other nation's. Education and training institutions--not Wall Street bankers--will be responsible for making most of the nation's productive investments.

Washington State Workforce Training and Education Coordinating Board, Olympia. (1999). *Workforce Training Needs and Practices of Washington State Employers*. U.S.; Washington: Washington State Workforce Training and Education Coordinating Board. A survey of 10,739 employers (37 percent rate of return) was conducted in Washington state from July through September 1999 to determine training and skill needs of employers and the capacity of the state's training programs to meet those needs. In addition, research was conducted through data matching of unemployment insurance and training program records and telephone surveys with former training programs students and the employers who hired them. Some of the findings of the survey were the following: (1) nearly two-thirds of firms looking for workers during the last 12 months reported difficulty finding qualified applicants; (2) the scarcity of skilled workers affected all industries, most particularly construction and manufacturing; (3) among those reporting difficulty, nearly three-quarters of firms said the scarcity of skilled workers lowered productivity, while about two-thirds said it reduced output and sales and the quality of products and services; (4) the most serious shortage was of workers with postsecondary training, especially vocational

training; (5) 9 of 10 employers had a hard time finding skilled workers with occupational-specific skills; (6) more than one-third of employers reported increasing classroom training for employees during the past 3 years; (7) 85 percent of employers provided on-the-job training; (8) nearly half of employers reported that the skills required to perform production or support or support jobs have increased during the past 3 years; and (9) nearly half of all nonsupervisory employees used computers on their jobs.

Washington State Workforce Training and Education Coordinating Board, Olympia. (1996). *Workforce Training. Supply, Demand, and Gaps*. U.S.; Washington: This study analyzes the gaps between supply and demand for workforce training in Washington State and recommends strategies for reducing the gaps. Using data from state and national surveys, supply and demand is analyzed in three categories: youth, adults, and adults with barriers to employment, from the perspectives of both employers and employees. Some of the findings are the following: (1) jobs requiring a high school diploma but no further training will be plentiful but low-paying, and employers report difficulty in finding young job applicants with occupation-specific, problem-solving skills, and positive work habits; recommendations include education reform, continuing the development of a school-to-work transition system, and increasing participation in vocational-technical education; (2) employers report difficulty in filling jobs with adults who have a vocational degree from a 2-year college, whereas adults report a lack of opportunity to participate in education to improve their job skills; and (3) economically disadvantaged adults, dislocated workers, and adults lacking basic skills face large gaps in the availability of services. Recommendations include the following: increasing efficiency at community colleges, adding community college students, increasing funding for job training programs, establishing a one-stop career center system, and developing new strategies for literacy education.

References – Other Geographic Areas

Brunello, G., & Medio, A. (2001). An Explanation of International Differences in Education and Workplace Training. *European Economic Review*, 45(2), 307-22. We develop a simple search equilibrium model of workplace training and education based on two features. First, investment in education improves job-related learning skills and reduces training costs by firms. Second, firms with vacant skilled job slots can choose between recruitment from the market and training. Compared to Germany and Japan, the US has both a higher inflow rate into unemployment and a higher efficiency of the matching process. While the combined effect of these differences on the share of educated labor is ambiguous, the effect on the percentage of firms undertaking workplace training is to unambiguously reduce it.

Doughney, J., Howes, J., Worland, D., & Wragg, C. (2001). *Apprentice and Ongoing Training Needs in the Electrical and Associated Industries*. Australia; Victoria: A study investigated skill shortages in the electrical and associated industries in Victoria and their nature and contributing factors. Research methods were a literature review, data analysis, and qualitative and quantitative research into apprentices, employers, and practitioners. Findings indicated a decline in the number of apprentices in training in this industry, and there is no evidence of a turnaround in this trend. Shortages appeared related to globalization, the emerging new economy, move to privatization in the Victorian economy, growth in self-employment, and other alternatives to traditional forms of work organization. Two plausible explanations of skills shortages were cost of apprenticeships and shortage of suitable applicants. Factors impeding firms from engaging apprentices under group schemes were employers' preference to employ apprentices directly and the commonly held view that the quality of group apprentices was inferior. Labor hire firms were discouraged from employing apprentices by the negative attitude of their clients, lack of suitable work, economic uncertainty, and greater flexibility inherent in the group training scheme. Practitioners identified specific shortages of skills, cited high wastage of people from the trade, and criticized recruiting methods.

Hughes, M., & MacPherson, S. (2001). *Developing Responsiveness in Vocational Education and Training*. United Kingdom; England: Learning and Skills Development Agency.

The extent to which providers of post-16 vocational education and training (VET) in the United Kingdom are able to secure timely and relevant learning programs to meet sudden and unpredicted changes in local or national skills profiles was examined in a study that included interviews of nine private training providers and 11 further education (FE) providers and case studies of 5 FE colleges. Forward planning by FE providers did not, by itself, appear to be sufficient to prepare for unexpected demands for VET. A nimble, responsive system is required that can rapidly customize provision to meet emerging needs. The following are among key ingredients of such a system: (1) the capacity to identify skills gaps and assess individuals' development needs; (2) clear articulation of needs in a common language; (3) expert staff who are able to work flexibly without detriment to regular provision; (4) the capacity to customize training packages; and (5) sensitive funding regimens that enable employers, individuals, and the local economy to upskill rapidly.

Kolling, A. (2002). *He Who Seeks Shall Find... Or Perhaps Not? Analysis of Firms' Searches for Qualified Personnel, Using Data from the IAB Establishment Panel 2000*. IAB Labour Market Research Topics No. No47). Germany:

The success of German firms' searches for qualified personnel to fill openings in skilled occupations was examined through a statistical analysis of data from the Institut für Arbeitsmarkt- und Berufsforschung der Bundesanstalt für Arbeit's (IAB) establishment panel for 2000. An employer search model was used to explain the current German debate surrounding the additional demand for skilled labor. In the theoretical approach adopted, firms decided to use an optimal strategy for searching

for new staff. For this purpose, firms set a minimum qualification level for applications with whom they concluded employment contracts. If qualification requirements must be determined exogenously, however, pursuing an optimal search strategy may become impossible and a firm's demand for labor may remain unsatisfied. Analysis of data from the IAB establishment panel established that it is particularly difficult for German employers to fill vacancies for engineers and computer scientists. Firms affected by unfilled vacancies often reported an absence of suitable applicants. The hypothesis of the search model was confirmed by multivariate analysis of the number of unfilled vacancies. Wage level, economic trends, and selected company characteristics also proved important.

Salt, J. (1992). The Future of International Labor Migration. *International Migration Review*, 26(4), 1077-1111.

Reviews the nature of international labor migration today and the economic and political rationale for its occurrence. It is suggested that developed economies will have little need for mass immigration by those with low-level skills, whereas poorer countries will encourage emigration, resulting in more illegal immigration.

Shirley, T., & Weiss, C. (2001). *Encouraging Higher Recruitment to Technician Engineering Training: Project Final Report. Research Report*. United Kingdom; England: Learning and Skills Development Agency.

Researchers studied current and projected needs for engineering technicians in the United Kingdom, the match between training supply and demand, and trends in direct recruitment to Level 3 engineering training in order to identify models of best practice for promoting the uptake of engineering technician training. The following data collection activities were conducted: a literature review; a review of two national databases; and site visits to selected further education (FE) and training providers and careers services. The study established that although the total number of individuals employed in engineering will decrease by about 5% in the next 10 years, the demand to replace those leaving the industry for retirement or other reasons will lead to a positive net requirement for all engineering occupations, including engineering technicians. The data suggested that recruitment through work-based apprenticeships and full-time FE routes may be insufficient to replace those leaving employment. The following were among the 11 principles of good recruitment practice identified: (1) ongoing explicit partnership arrangements between schools, colleges, training providers, and industry; (2) information and awareness opportunities for all teachers about progression through vocational and work-based pathways; (3) assistance and support for learners; and (4) provision of extracurricular engineering activities to stimulate interest and enjoyment.

Smith, A., & Freeland, B. (2002). *Industry Training: Causes and Consequences*.

Australia; South Australia: National Centre for Vocational Education Research. Research on Australian organizations in five industry sectors--building and construction, food processing, electronics manufacturing, retailing, and finance and banking--has identified these three key drivers of enterprise training: workplace change, quality assurance, and new technology. Operation of the training drivers is

moderated by a range of factors internal to the enterprise of training moderators, including enterprise size, industry traditions of training, occupational structure, industrial relations, management attitudes, and government training policy. Forthcoming research has also investigated the type of training provided when there are these five forms of workplace change: teamworking, total quality management, lean production, learning organization, and business process re-engineering. An Australian Industry Group study points to these number of key factors associated with provision of industry training in Australian enterprises: workplace change, generic skills, training and business strategy, and new training structures. Skills and training requirements for Australian enterprises are changing. There is an increasing demand for higher levels of skills; the source of these skills will be adult re-skilling; and changes in the labor market are emphasizing the emergence of non-standard forms of employment, such as casualized and outsourced workers.

Wainwright, T. (2005). UK looks abroad to fill jobs. *The Times Higher Education Supplement*, (1702), 1.

A survey has revealed British universities' increasing dependence on overseas academic talent. The Times Higher Education Supplement survey showed that an average of 35 percent of academic appointments made in the past two years by 16 participating universities went to overseas applicants, compared to 29 percent among all universities in 2003-2004.

Appendix B: Excluded References

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