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Skills and Knowledge for Canada's Future: Seven Perspectives

Towards an Integrated Approach to Human Capital Development

Overview

by

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Foreword

Canadians recognize that widespread opportunity to develop skills and acquire knowledge is critical to Canada's prosperity. Governments, individuals, and employers all have reason to invest in learning activity, because skills and knowledge are assets that we draw upon to be productive in our paid work, in our communities, and in our families. It is this notion of investment that has led economists to refer to the acquisition of skills and knowledge as the development of 'human capital.'

Research on human capital takes place largely within the silos of particular academic disciplines. CPRN, and its partners at the School of Policy Studies of Queen's University (SPS) and Statistics Canada, decided that it would be helpful to develop a more integrated approach by bringing together leading researchers to share key findings from a variety of academic disciplines on the factors that affect the acquisition of skills and knowledge, and the outcomes, individual and societal, that are associated with human capital. We agreed at the outset to take a 'life course' perspective: to consider how influences at early stages of life might have implications for human capital development at later stages.

Experts from seven disciplines met in Ottawa last January to discuss their work in progress. Their research has culminated in this set of reports, *Skills and Knowledge for Canada's Future: Seven Perspectives - Towards an Integrated Approach to Human Capital Development.*

The research shows that the gains from the acquisition of skills and knowledge go well beyond improved employment prospects to include 'social gains" such as less crime, improved health, greater participation in political activity, more engagement of citizens in their communities, and a more innovative economy. The papers also point to the value of integrating family, education, and public health policies.

I would like to thank the contributors to this volume, our partners at Statistics Canada and the School of Policy Studies at Queen's University, the staff of CPRN involved in the project, and the organizations who provided financial support and advice: Human Resources and Social Development Canada; the Canadian Council on Learning; Alberta Human Resources and Employment; the Ontario Ministry of Training, Colleges and Universities; and the Canada Millennium Scholarship Foundation.

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June 2006

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Towards an Integrated Approach to Human Capital Development: Overview

1. Introduction

Much has been written in recent years about the importance to both economic and social objectives of providing widespread access to opportunities for learning and skills development to individuals throughout the course of their lives. This is sometimes referred to as the need to promote the development of 'human capital.'

This volume, arising from a research program managed by Canadian Policy Research Networks (CPRN), the School of Policy Studies at Queen's University (SPS), and Statistics Canada, is designed to advance our understanding of:

- the factors contributing to human capital development (HCD);
- the connections between the acquisition of human capital and individual and societal outcomes, and
- the policy implications of these relationships.

For the purposes of this program of research, we define human capital as skills and knowledge that can be drawn upon (like any 'asset') by an individual to generate outputs of value. Personal health would not qualify as human capital in this approach, though one could imagine a broader definition of human capital that goes beyond skills and knowledge. However, the scope of our investigation is nevertheless quite broad, for two reasons:

1) Outputs of value" need not just be marketed outputs. Civic engagement, for example, might be an output of value. Citizenship skills could qualify as human capital.

2) We are interested not only in human capital as a dependent variable (what factors influence the acquisition of skills and knowledge), but also in human capital as a factor affecting individual and societal outcomes. The latter would of course include the kinds of labour market outcomes (higher employment rates, better earnings) typically investigated, but could also include improved health and greater civic engagement.

For example, we are interested in personal health, not because it is human capital, but because it might affect the acquisition of human capital (skills and knowledge) and because it might be one of the outcomes we examine that is affected by the acquisition of human capital. We are interested in citizenship skills as a form of human capital and in civic engagement as an outcome.

We treat social capital – the nature and density of the networks to which people are connected – as distinct from human capital, but we are interested in identifying the extent to which social capital affects the acquisition of human capital. For example, how do peer groups in high school affect educational attainment?

As the outset of developing this project, it appeared to us – the organizing team from CPRN, the SPS, and Statistics Canada – that most research and policy activity to date on HCD was occurring within departmental and disciplinary silos and was focusing on relationships among variables in contiguous time segments. An example would be research that examines the effects of family income level on the decision of high school graduates regarding participation in post-secondary education. Accordingly, to push the frontiers of work in this area, we saw the need to bring people together from different disciplines and to look at connections between early (child and adolescent) life experience and outcomes in later stages of the life course.

In the first phase of the project, which is the subject of this volume, we brought together researchers from seven different academic disciplines – economics, sociology, psychology, education, public health, economic geography (clusters), and political science – to provide a synthesis of recent research in their discipline on HCD. Draft papers were presented at a workshop held on January 13th, 2006, and the authors shared not only the findings of their discipline, but also their ideas for new research that could go beyond the usual disciplinary boundaries.

The 'synthesis' papers, as a group, investigated the following questions:

- What does the existing research (in each discipline) tell us about the factors that influence human capital development and the utilization of human capital in the workplace? Which causal connections are well established, and which are more speculative? Which influences have the greatest impact?

- What does the research tell us about the effects of human capital acquisition on individual and societal outcomes? For example, to what extent are higher levels of skill and knowledge associated with higher employment rates, better earnings, improved health, and greater civic engagement?

- What does the research tell us about the role of various "institutions" – families, schools, peers, social services, higher education institutions, employers – in supporting human capital development at various stages of the life course?

- What are the policy implications of these streams of research?

- What key questions are not being answered (or asked)? What new ways of framing the issues might be worth exploring? What gaps in data availability need to be addressed?

- How can we look beyond conventional disciplinary boundaries? Where could those boundaries be breached in the most interesting, creative, and useful manner, in terms of subject matter, methodology, or in any other respect?

We are planning a second phase of the project that would involve new cross-cutting research that integrates approaches across disciplines, leading to a conference early in 2007.

2. Snapshots and Trends in Human Capital Development

The January 2006 workshop began with a presentation, developed by members of the organizing team, on key trends in and current data on various aspects of human capital development, and we include those slides (slightly revised) in this volume. Among the highlights are the following:

- The rate of participation of Canadian children under age 5 in an education program is among the lowest of countries who are members of the Organisation for Economic Co-operation and Development (OECD). (See the last slide in the set.)

- In 2000-2001, about 17 percent of 4- and 5-year olds had poor language skills as measured by *The Peabody Picture Vocabulary Test–Revised* (PPVT-R). Other findings from the *National Longitudinal Survey of Children and Youth* indicate that children who performed poorly on the PPVT-R are twice as likely to experience school achievement problems two years later.

- Canada performs relatively well on international assessments of the learning achievement of high school students. For example, the Programme for International Student Assessment measured the performance in 2003 of 15 year olds in mathematics. Among the 41 participating countries, only two – Hong Kong-China and Finland – performed better than Canada. Students in seven other countries performed as well as Canadian students, while students in the remaining countries performed less well.

- High school drop-out rates have declined significantly in Canada in the last 15 years. By 2004-05, just below 10 percent of 20-to-24-year-olds were neither attending school, nor had a high school diploma. However, this rate is much higher (12.2 percent in 2004-05) for young men than for young women (7.2 percent).

- The share of Canadians aged 25-29 with a university degree has risen substantially since 1980, and more so for young women than young men. The percentage of Canadians aged 25-34 with a university degree is among the highest in the world, though below that of the US.

- The gap in the overall participation rate in post-secondary education of people from low-income families compared to those from high-income families did not increase in the 1990s, despite rising tuition fees. However, there is some evidence that sharply rising fees for professional programs had an impact on those of middle-level socioeconomic status.

- The gains (in earning levels) from having a university degree compared to just a high school diploma have risen markedly since 1980. Earnings for people aged 25-29 with lower levels of education declined (adjusted for inflation) between 1980 and 2000. However, Canada has a relatively high percentage of post-secondary graduates who are in low-skilled jobs.

- Gains associated with more education go beyond earnings. For example, there is some evidence that higher levels of educational attainment are associated with greater civic

engagement, greater likelihood of voting, and better health outcomes. (See the papers by O'Neill and Riddell in this volume for more on this.)

- The rate of participation in job-related learning by adults in Canada rose between 1997 and 2002, though the gap between the better-educated and the less-educated increased. The improvement in the overall participation rate is mostly due to engagement in learning activities by individuals outside the support of their employers – there was little increase in the rate of employer-sponsored training.

- The participation rate in job-related adult learning in Canada is in the middle of the pack of OECD countries and well below that of the US.

Overall, these background data suggest that the Canadian primary and high school systems are performing fairly well (looking at international achievement tests) and that access to post-secondary education is fairly high (though some still face barriers), but that our performance in access to early childhood education and adult learning opportunities leaves much room for improvement.

3. Key Findings of the Synthesis Studies

We begin at the beginning, namely by looking at how child (and even pre-natal) health affects later human capital development. In their paper, "The effects of deficits in health status in childhood and adolescence on human capital development in early adulthood," Cameron Mustard, Emile Tompa, and Jacob Etches note that children with poor physical or mental health may find it difficult to fully benefit from primary and secondary schooling and may have lower expectations for post-secondary educational attainment.

Mustard et al. review evidence of the effects on human capital acquisition of a selected range of child and youth health conditions: fetal alcohol exposure, lead exposure, low birth weight, delayed growth, childhood behavioural disorders and childhood functional limitations.

Fetal alcohol exposure, even at 'social drinking levels,' can lead to reduced academic and social functioning through longer reaction times, inattention, hyperactivity, and developmental delay at preschool ages; learning problems, attention and impulsivity problems, memory deficits, distractibility, restlessness, lack of persistence, and mood disorders during school ages; and attention problems, difficulty with problem solving and functioning in everyday life, adult antisocial syndrome, and alcohol, drug, and nicotine dependence in adulthood. Lead exposure, at any level, is associated with lowered IQ, impaired neuropsychological functioning, and impaired academic achievement. Deficiencies in iron, calcium, zinc and protein, which are more likely in disadvantaged children, increase lead absorption. Low birth weight is associated with impaired cognitive ability, independent of subsequent body size. Childhood and adolescent cognitive ability is also associated with length of breast feeding. Mustard et al. note that, "Breast feeding is thought to promote cognitive development and thereby educational achievement by supplying specific long-chain fatty acids that are needed for brain and eye development during gestation and the first year of life." Hyperactivity at ages 4–16 is associated with reduced upward occupational mobility in young adulthood for boys and decreased upward educational mobility for boys and girls.

While none of these conditions has a high prevalence, Mustard et al. state that "the cumulative prevalence of all childhood disorders that may have consequences for human capital attainment will be in the range of 15-25 percent of the population of children." This presents a strong case for government intervention to reduce the incidence of these disorders. Mustard et al. argue that the policy response must cut across traditional departmental boundaries and that it should be targeted to the most vulnerable households and children.

The second paper in the collection, Craig Riddell's study, "The Impact of Education on Economic and Social Outcomes: An Overview of Recent Advances in Economics," highlights how 'natural experiments' (such as increases in the age of compulsory schooling) have improved our understanding of the relationship between educational attainment and labour market outcomes. These studies indicate that the effect of increased educational attainment on earnings is even larger than previously believed, especially for those with relatively low levels of education.

Riddell also points to recent evidence of non-market and social benefits of education, such as fostering innovation, enhancing productivity of those with whom the highly educated interact and work, improving health, reducing crime, and fostering civic participation. The social returns to education appear to be substantial, though the evidence is mainly from US studies, as the Canadian literature is thin in this area. Moreover, there is the possibility of intergenerational gains through effects of parental education on child development, health and education.

These findings enhance the case for such government interventions the financing of post-secondary education, and providing more information on the consequences of additional schooling. They also support the recent initiatives in some provinces to increase the age of compulsory schooling.

Riddell concludes that while we can be more confident than in the past that education has large, positive impacts on a variety of individual and social outcomes, we need a better understanding of the pathways through which such effects occur. He asks, "Does education alter the way that individuals access and process information?"

Some light on this question is shed by Jacqueline Leighton in the next paper in the collection, "Increasing Adaptive Expertise: The Next Frontier in Human Capital Development." She notes that variables such as neural efficiency and working memory predict measured intelligence, suggesting that more intelligent people use their brains and manage information processes more efficiently. While there is a strong inherited component to intelligence, Leighton points to research that indicates that education can make a difference. She refers to the work of Garlick, who concludes that "better organized brain systems are likely to arise when young children are exposed to learning environments that challenge their developing brains to create highly efficient connections in adaptation to difficult tasks." Garlick claims that theory-based reasoning should be introduced to students at a younger age than is currently the norm.

Leighton also points to findings that working memory can be enhanced at any age through intensive, deliberate practice and 'chunking' of information. Research in psychology also indicates that when children and adults are taught to engage in theory-based reasoning – thinking that seeks to uncover the underlying causal principles – they are better able to reuse their knowledge and transfer their skills to new areas and new problems. Leighton notes that human capital can be fostered by applying the results of systematic research on the development of adaptive expertise to teaching methods. Further research along these lines requires greater access by psychologists to children and student populations in classroom settings.

Issues regarding the education system are also the subject of the next paper in the collection, though from a different perspective. In "Human Capital Development and Education," Robert Crocker looks at research on the 'education production function': the relationship between resources in our schools and learning outcomes, with a focus on the K-12 system.

Crocker's main conclusion is that the research on resource effects had not yielded many consistent results, which makes it difficult to advise policy makers about funding priorities. There is some evidence that smaller class sizes (fewer students per teacher) in the primary grades yield higher achievement levels. However, the research indicates that it would take large

reductions in class size, and therefore a large increase in funding, to obtain the improvement in outcomes. In practice, when governments move to reduce class size, the reductions tend to be modest. The evidence suggests that the benefits of this are questionable. Crocker cites Hanushek's conclusion that what matters is not resources but how they are used. There is some evidence from US studies that spending targeted on disadvantaged students does improve achievement.

Crocker also cites evidence that teachers with a few years of experience perform better (in terms of learning outcomes of their students) than neophytes, but that there isn't much evidence of gains from experience beyond that point. Specialization is an advantage, but there is no evident gain in student outcomes from teachers having higher degrees.

Regarding future research, Crocker points to the need to get inside the 'black box' of educational processes through more collaboration between those looking at resources and outcomes and those studying education processes. The former group has tended to rely on secondary analysis of existing data sources; the latter with the micro world of the classroom, but with little examination of the resources needed for different teaching processes. Crocker argues that it is important to pay attention to resources, but that advances are more likely to come from micro-level research than from the analysis of large scale surveys.

Stephen Morgan and Mark McKerrow look at factors affecting educational attainment from a sociological perspective in their paper, "Human Capital Development and the Frontiers of Research in the Sociology of Education." They consider four broad explanations – family background, race, opportunities to learn, and school effects – for motivation and commitment to schooling, learning and preparation for postsecondary education, and resulting educational attainment.

Morgan and McKerrow rely mainly on US studies in their review of the literature, as the Canadian literature on the sociology of education is thin, in part because Canada lacks a national, school-based, longitudinal survey. Even in the US literature, there are few consensus positions about the impact of the key influences itemized above. The strongest findings in the research relate to grade retention (requiring students who are not meeting standards to repeat the grade) and ability streaming (placing high school students in academic or non-academic tracks).

The theory behind grade retention is that the threat of retention stimulates student effort and the fact of retention enables poorly performing students to improve their understanding of the curriculum. However, the evidence examined by Morgan and McKerrow indicates that grade retention does more harm than good. Students who have been held back do not appear to learn more and they are far more likely to drop out of secondary school.

The evidence on the net effects of ability streaming is mixed. While non-academic pathways can benefit some students, there are risks that streaming can be class-biased. Studies that control for academic achievement and ability, find that students of higher socio-economic status are more likely to obtain higher-track placements. So, where streaming is in place, Morgan and McKerrow point to the need for steps to avoid this bias.

Morgan and McKerrow also note the potential gains associated with certain kinds of peer networks ('social capital'). Since the literature suggests that many disadvantaged students are uninterested in structured extracurricular activities, they raise the question of whether schools should provide more mandatory activities, or expanded unstructured opportunities for students to develop their peer networks. However, they also suggest that the opportunity for "the cultivation and reinforcement of anti-schooling norms in some associational groups" must be recognized and prevented by school officials.

Morgan and McKerrow argue that our understanding of these issues could be improved by more comparative research, particularly Canada-US comparisons. As an example, they suggest an examination of factors affecting high school completion and/or participation in post-secondary education in Canada and the United States.

The next paper in the series, "Networking, Clusters and Human Capital Development," by Diane-Gabrielle Tremblay, considers the role of informal exchanges in knowledge development within local-regional clusters of firms. "Clusters (single sector) and "*innovative milieux*" (multi-sector) are geographic concentrations of firms and supporting organizations that "*trust*" one another and frequently exchange knowledge." Clustering is seen as contributing to economic growth, as the proximity of firms with similar or complementary strengths leads to a flow of information that fosters productivity and innovation. "[I]t is through interactions that representations and ideas are exchanged, that knowledge is developed, and this contributes to support firms and entrepreneurs in a given cluster."

Clusters both rely upon and contribute to the development of human capital in the region in which they operate. In this context, Tremblay notes the importance of post-secondary institutions and research centres in developing knowledge and contributing to the circulation of science or technology based clusters. However, cluster literature also highlights that knowledge development can occur because of proximity between actors who may even meet just by chance, and not only in formal settings such as post-secondary institutions. Tremblay explores the concept of communities of practice: groups of people within a cluster, who (across firms) have shared interests and who deepen their expertise by interacting frequently. She suggests further research on communities of practice, how they are formed, and how they contribute to human capital development within clusters.

The final paper in the collection is, "Human Capital, Civic Engagement and Political Participation: Turning Skills and Knowledge into Engagement and Action," by Brenda O'Neill. O'Neill reports evidence that increased educational attainment is associated with higher levels of political participation, not only through imparting knowledge and developing citizenship skills, but also through enhancing the motivation to participate. The increase in motivation is particularly associated with higher education, partly through curriculum that conveys a sense of civic responsibility and duty.

O'Neill also points to the role of social capital – the networks connecting people to each other – in fostering civic engagement. In particular, she notes evidence that mobilizing agencies, such as trade unions and religious organizations, help draw citizens into action, in part through building

feelings of trust and reciprocity (social capital), and also through developing citizenship and political skills, and through the direct opportunities they provide for volunteering.

Not only do the acquisition of human and social capital foster participation and engagement, but, to some extent, there is evidence that the converse is also true: participation in politics can help develop skills needed to work with others through collective action, and enhance people's capacity to appreciate other points of view. O'Neill cites several policy implications of this literature. Investment by governments in education, including higher education, is warranted not only by considerations of productivity in an economic sense; it also provides returns in terms of enhanced political participation and citizen engagement, and more effective articulation of values and interests in the political process. In particular, there is a need for a renewed commitment to a civics curriculum in our K-12 system. Governments can also foster civic engagement through support of voluntary associations. In their role as mobilizing agencies, such organizations provide an important avenue for developing citizenship skills, particularly among disadvantaged groups.

The papers in this collection focus on examining factors affecting, and outcomes associated with, the development of human capital from the perspective of particular academic disciplines. However, some themes cut across more than one paper. For example, several authors point to the importance of early interventions in order to safeguard later potential. The paper by Mustard et al., with its focus on avoidable child health conditions that can impair later learning and development, is the most explicit in this regard. Leighton points to the importance of teaching our children in ways that enhance their working memory and 'neural efficiency.' O'Neill calls attention to the value of including civics education in the K-12 curriculum. Of course, the concept of human capital is inherently about investments that pay off over time, but these studies point to gaps in particular kinds of investment in our children that call for a policy response.

Social capital is raised by several authors as an important influence on the acquisition of skills and knowledge. For example, as we have just seen, O'Neill cites evidence that participation in voluntary associations is associated with increased levels of trust and co-operation within communities and that such social capital helps build citizenship skills. Morgan and McKerrow refer to research findings that community practices and norms that build trust among students, teachers, and principals have contributed to the success of Catholic schools in the United States. Morgan and McKerrow, as well as Riddell, refer to the effects of peer relationships on educational attainment. Tremblay refers to the importance of trust in building relationships within clusters of firms. It seems clear that the density and quality of social networks are key influences on both the acquisition and utilization of human capital.

Another cross-cutting theme is that the gains from the acquisition of human capital, particularly the gains from formal education, go well beyond improved employment prospects and earnings in the labour market. Other gains include: reduced crime, improved health, greater and more effective political participation, and enhanced engagement of citizens in their communities. Similarly, the papers collectively point to the potential gains from integrating family, education, and public health policies (as noted explicitly in the paper by Mustard et al.).

One policy recommendation that seems to flow from this collection and is explicit in several papers is to keep our young people in school. The gains from formal education seem clear, and Riddell points to evidence that the incremental gains are particularly high for the less-educated. Some provinces have recently moved to extend the age of compulsory schooling. It will be important to monitor and evaluate the impact of this policy change. This takes us to the issue of opportunities for further research, which we explore in the conclusion to this overview.

Where do we go next?

We are planning to launch a second phase of research on human capital that would emphasize work that bridges disciplinary boundaries, but that would also be of practical value to those involved in policy development. This could include research that is rooted in the methodology of a single home discipline, but we will encourage researchers to look at the issues from a broad perspective.

Examples of topics that fit the objective of promoting cross-cutting, integrative work might include:

- The effects of early childhood experiences on subsequent learning. (The idea would be to see what can be drawn from the data produced so far from the National Longitudinal Survey of Children and Youth).
- The impact of education/learning (perhaps at different stages of the life course) on health behaviours and health outcomes.
- How to provide more vocational options in high school without premature streaming. (Evidence could also be examined on different institutional forms e.g., co-op education, school-based vocational education, a mix of the two, apprenticeship or pre-apprenticeship programs.)
- Pathways to work in the apprenticeable skilled trades: who enters, who completes, and why.
- The experience of new entrants to the labour market (youth, immigrants, women after caregiving) and their commonalities and differences with respect to human capital development needs.
- A multivariate analysis of determinants of economic outcomes (employment, income) of recent immigrants using the Longitudinal Survey of Immigrants to Canada.
- The distribution of returns to education/learning (who gains the most; who is left behind).
- The impact of access to health services on educational attainment and labour force participation.
- Institutional barriers to lifelong learning. (CPRN might offer a paper on this, based on results of a project now underway looking at adults' access to learning opportunities.)

- A review of the literature regarding the most effective modes of delivery of skills upgrading programs for adult learners.
- A review of the literature on adjustment programs for workers affected by major downsizings (both in larger centres and in those where the downsizing employer is a large part of the local labour market).
- Policies to promote smooth adjustment to emerging skill shortages.
- The pros and cons of 'learning accounts' (like RESPs, only allowing for a much larger range of learning activity over the life course).
- Relationships between learning activity and life-satisfaction/well-being
- The impact of K-12 civics education on participation in lifelong learning.

Our aim is to promote a more integrated understanding of what factors contribute to the acquisition and utilization of skills and knowledge, and what outcomes – for individuals, for organizations, and for society as a whole – are associated with the development of human capital. The volume is one step in that journey.

Our Support

Funding for this project was provided by:
- Alberta Human Resources and Employment
- Canada Millennium Scholarship Foundation
- Canadian Council on Learning
- Human Resources and Skills Development Canada
- Ontario Ministry of Training, Colleges and Universities

Donations:
BCE Inc.
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