



Consequences and Policy Implications for University Students Who Have Chosen Liberal or Vocational Education in Canada: Labour Market Outcomes and Employability Skills

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The analyses suggest that study choices are significantly related to transition success. It appears that the labour market favours vocational over liberal graduates with regard to employment status, income, job security and job satisfaction. Given the strong and consistent differences in labour market outcomes between liberal and vocational graduates, we anticipated similar differences in employability skills across these groups. However, what we found was a surprising lack of difference between liberal and vocational graduates in their employability skills. Employers were nevertheless more likely to utilize employability skills from vocational than liberal graduates. Differences in the opportunity to apply such skills might be due to problems in the flow of trustworthy signals between graduates and employers. Greater trust between employers and graduates with respect to skills utilization likely reflects the more formalized network with respect to vocational fields of study that link employers, students and the university.

Higher Education Policy (2003) 16, 55–85. doi:10.1057/palgrave.hep.8300002

Keywords: University graduates; field of study; labour market outcomes; employability skills; Canada, school-work transitions; satisfaction; liberal education; vocational education

Introduction

One of the most important decisions made by students, either prior to entering university or while enrolled in university, is their choice of a field of study.¹ This choice has strong implications for future life-course pathways, including long-term labour market outcomes (HRDC, 1996). Studies of individual career paths suggest that the period immediately following graduation — for example, the two years following graduation — strongly influences eventual



position in the labour force (Anisef *et al.*, 1999a–d). If early employment experiences are important to career building, it is essential to examine linkages between fields of study and labour market outcomes during the school–work transition phase. In this paper we take up the question: What are the immediate labour market consequences of having chosen a particular field of study for university graduates?

Debates over the differential outcomes afforded by a university education focus on the tension between cultural and instrumental values or, more specifically, the tension between liberal and vocational education. We define liberal education as a pedagogy that provides a broad, balanced, flexible, and human-centred education. Hence, the main functions of a liberal education are to advance and disseminate knowledge and to facilitate personal growth and development among the students who enrol. Vocational education, on the other hand, aims to provide specific skills for certain professions. Skill training occupies a central place in providing such an education.

Much current debate involving the impact of field of study on school–work transitions concerns the relative value of a liberal or vocational education. For the most part, these discussions occur among academics that argue for the importance of a humanistic education in the personal and intellectual growth of students (Anisef *et al.*, 1999a–d). Employers are equally divided in their assessments of liberal or vocationally oriented university programmes, but all are consistent in their desire to engage employees who possess the ‘employability skills’ needed to meet the demands of the new economy — that is, graduates who are socially adept and who have the capacity to solve problems, judge merit, and make decisions (Conference Board of Canada, 1998).

The critics of a liberal education argue that students who are trained in these fields are ill equipped to locate challenging and satisfying jobs. The critics of a vocational education are equally quick to argue that students exposed to a vocational education are too narrowly trained and generally incapable of dealing with the complexities of a global society. Thus, a second question that we seek to answer in this paper is: Do the employability skills possessed, acquired and utilized by university graduates enrolled in liberal and vocational fields of study differ significantly?

Skills acquired by university graduates in different fields of study may or may not meet the needs of employers struggling to compete in a highly competitive global economy; and the debate over the utility of liberal or vocational fields of study suggests this is, in fact, the case. In explaining differences in the labour market outcomes of university graduates, it should prove illuminating to compare liberal and vocational graduates’ acquisition of the skills employers contend are of value to them. Also one can assess employers’ utilization of the skills possessed by graduates and

the comparison made between possession and application. Where there are no significant differences in the skills, liberal and vocational graduates report they possess yet substantial variations in how employers value and utilize them (e.g. significant differences in salaries) and hence one may conclude discontinuities exist between the rhetoric and practice of employers. It may be that employers respond more to field of study labels than to the cognitive skills these fields impart (Rosenbaum *et al.*, 1990). It is also possible that the skill profiles of liberal and vocational graduates vary in complex ways making it difficult for employers to interpret and make the best use of graduates' skill. Alternative explanations also are possible. Krahn and Lowe (1998) and Livingstone (1999), for example, have argued that the economy fails to provide work requiring advanced skills and knowledge. From this perspective, employers are essentially under-employing graduates (Anisef *et al.*, 1996).

Research Questions and Rationale

School–work transitions

The first question addressed in this study involves an examination of the link between field of study choice and labour market outcomes. The theoretical perspective we rely on in exploring the labour market pathways of university graduates relates to the work of Beck (1992, 1999) who argues that we now live in a risk society where school–work transitions are no longer predictable and linear. Rather, they are more uncertain in nature, and call increasingly on individuals to make careful plans for the future. Rudd and Evans (1998) use the term 'structured individualization' to describe pathways as outcomes resulting from individual choice and experience (agency), and influenced as well by demographic, cultural and structural influences (structure). Anisef *et al.* (1999a–d), Hays (1994) and others similarly assert that structure and agency combine to influence the decisions and actions taken by individuals and in that way influence their life chances. Heinz (1999) and Furlong and Cartmel (1997) have characterized school–work transitions as a series of agentic actions that lead individuals to achieve more or less successful employment futures in a rapidly changing economy.

The occupational structure of Canada has been undergoing dramatic change in recent years. Two key features of the changing Canadian economy are reflected in the distinction currently being made between knowledge-based and skills-intensified characteristics. It should be noted that most studies do not distinguish knowledge from skills. The term, knowledge-based, refers to general skills including academic capability, personal management, and teamwork (Betcherman *et al.*, 1998, 8). 'Skills-intensified' involves specific



techniques, including ‘know-how’ and job-specific skills. These two characteristics of the new economy have quickly emerged as central in discussions over the relation between education and labour market outcomes, as well as the debate around the value of a liberal (knowledge-based) and vocational education (skills-intensified).

In *Reflections on the Changing Workplace in Canada*, Osberg (1997) indicates that risk has become greatly individualized as support for post-secondary funding fails to increase and tuition costs rise. Students must be clear in choosing their area of study, since they are now faced with the prospect of much greater debt loads upon graduation (pp 150–151). The sense of risk in choosing among fields of study is also reinforced by the notion that such fields play an important role in stratifying Canadian university graduates in terms of income, unemployment rates, work prospects, and job satisfaction. For example, the full-time earnings of the highest 10% of graduates from medicine are \$114,500, their unemployment rate is about 5%, lower than most graduates in other areas of study, and 98% of them are satisfied with their work (HRDC, 1996, 188–189; Little and Lapierre, 1996, 30). In contrast, for the highest 10% of history graduates, full-time earnings are \$53,200, less than half that made by graduates from medicine. As well, they experience a higher unemployment rate, although 82% of them are satisfied with their work, which indicates reasonable job satisfaction (HRDC, 1996, 166–167).

Based on structuralist perspectives, researchers have attempted to link field of study choice and educational returns to individuals. In this regard, gender, ethnicity, family background, and region of origin are frequently introduced to contextualize field of study decisions. Davies and Guppy’s (1997) analysis of national longitudinal survey data revealed that US male college students were much more likely than females to enter fields of study with high economic returns. In addition, socio-economic factors did not affect entry into lucrative fields net of other background factors, but did affect entry into selective colleges.

Wannell and Caron (1995) reveal, for example, that women are more likely to study nursing (95%), social sciences, and humanities, while men dominate in the fields of engineering (85.4%), computer science (80.4%), and other sciences (p 22). The choice of areas of study can be understood not only in terms of gender, it can also be interpreted in terms of race and social class. For instance, Aronowitz and Giroux (1985) suggest that liberal arts programmes within US colleges are ‘dumping grounds’ for minority and working class children. Despite field of study appearing to be a matter of individual preference, it is one, nonetheless, that is significantly influenced by gender and social class, even when personal academic achievement levels are controlled (Davies and Guppy, 1997). In addition, regional differentiation is widely used to characterize the Canadian university system, insofar as policy changes fall

under the jurisdiction of the provinces and territories (Jones, 1997). This suggests the importance of including region as a structural factor in exploring field of study choices. In addition to assessing the influence of social structural factors on the choice of fields of study and labour market outcomes, it is also important that we assess the impact of agentic factors (as indicated by field of study choice) on labour market outcomes of university graduates. Faced with a sense of increased risk, it is rational for students to react either by ‘diversifying their portfolios’ by opting for generalist, rather than specialist, credentials, or decreasing their level of investment (Osberg, 1997, 151).

As this overview suggests, there is relatively little research that has dealt directly with the relation between university fields of study and labour market outcomes in the period following graduation. Existing studies nevertheless provide evidence that fields of study influence graduates’ labour market outcomes in the long term. Allen (1999a,b), for example, used 1996 census data to illustrate wage differences among university graduates from various fields of study. Cote and Sweetman (1998) similarly analysed the 1994 General Social Survey data and found that fields of study have effect on graduates’ wages. These studies did not, however, detail the link between fields of study and the initial labour market position of graduates. In examining this relation, the present study will focus attention on the school-to-work transition period.

Employability skills

The second research question posed addresses the role of employability skills in determining the labour market outcomes of graduates. The Conference Board of Canada (1998) recently released a report entitled *Employability Skills Profile: What are Employers Looking for?* in which they refer to such foundational skills as the generic intellectual skills, attitudes, and behaviours that employers look for in new recruits and that they seek to develop through on the job training programmes for current employees. The profile developed by the Conference Board divides skills into academic skills (i.e. communication, thinking and learning), personal management (i.e. positive attitudes and behaviours, responsibility and adaptability), and teamwork skills (i.e. the ability to work effectively with others). While this paper is useful in laying out the generic types of skills needed to fuel today’s economy, it masks a series of debates that relate to: (1) the actual skills that employers actively seek among employees; (2) a growth in unemployment and underemployment at a time that the supply of highly educated people in Canada is greater than in any other period in its history.

A recent federal advisory panel, established to determine whether Canada was experiencing a shortage of skills, recommended that all levels of the educational system — from elementary to post-secondary — be reshaped to



meet the needs of business. The Expert Panel on Skills in its final report, *Stepping Up: Skills and Opportunities in the Knowledge Economy*, concluded that while there is no shortage in technical skills (Finnie, 1995), Canadians do lack essential communication and teamwork skills that are needed for today's business environment. Schools need to serve the interests of employers better by promoting corporate values (cited in CAUT, 2000, 1, 8). Many educators, however, are sceptical of this position and argue forcefully for a broad-based liberal education rather than one that caters specifically to corporate interests. Indeed, Gingras and Roy (1998), drawing principally on descriptive statistics, conclude that there is no reason to believe that Canada suffers from a broad-based shortage of skilled labour or that its work force cannot fulfil the economy's needs. Furthermore, available data indicate that Canada compares favourably with many of its principal competitors in world markets. However, Boothby recently completed a study drawing upon data from the International Adult Literacy Survey (IALS) that show that, while most Canadian post-secondary graduates have high levels of literacy skills, approximately 17% (predominantly non-university graduates) have low levels of literacy skills (e.g. prose, document, and quantitative literacy). Since most post-secondary graduates tend to work in the skilled information sector, graduates with low literacy skills find it difficult to obtain positions within this sector and tend to earn less than post-secondary graduates with appropriate literacy skills. Although Boothby finds evidence for an increase in occupational mismatch between 1981 and 1991 for university graduates, he concludes that this increase is attributable to the number of graduates growing more rapidly than the level of paid employment in skilled information occupations (Applied Research Bulletin, 1999, 19). In a separate analysis of the changing skill structure of employment in Canada, Gingras and Roy (1998) support the conclusions drawn by Boothby, indicating that the 'supply of highly educated individuals appears to have more than offset increases in demand' (p 37). However, employment in occupations requiring high levels of cognitive and communication skills has increased faster than in other occupations (p 36).

In a report prepared by Krahn and Lowe (1998), the 'job-skills gap' was explored in terms of workplace literacy utilization. In order to address the existing research gap on this topic, these researchers used data from the Canadian component of the 1994 IALS. The first goal of the analysis was to map the 'fit' or 'mismatch' between workers' literacy skills and their job requirements. Within the 'mismatch' category, the prevalence of literacy deficits (i.e. workers with limited literacy skills in jobs that frequently require reading, writing, and mathematical operations) and literacy surpluses (workers with well-developed literacy skills in jobs that did not take advantage of these skills) was documented. This analysis of IALS data revealed that about three-quarters of Canadian workers were in jobs with literacy skill requirements that



roughly ‘fit’ their literacy skills. Within the ‘mismatch’ category, literacy surplus was much more evident than literacy deficit. Thus, with respect to literacy, the ‘job–skills gap’ may have resulted from an insufficient number of high skill jobs. While there were workers with limited literacy skills, there were many more in jobs that did not take full advantage of their well-developed literacy skills. Livingstone (1999) similarly suggests that overall technical skill requirements have only gradually increased in recent decades in the US and Canada. De-skilling may now be almost as prevalent as upgrading, even in high tech industries (1999, 7). Part of the irony of the education–jobs gap has been that conditions of underemployment become associated with further learning. As a consequence, ‘A vicious circle of more learning for fewer jobs is now well established’ (Livingstone, 1999, 6).

Data Sources and Research Methods

The National Graduates Surveys and the working samples

On behalf of Human Resources Development Canada, Statistics Canada conducts the NGS to learn about graduates’ labour market experiences after graduation. Along with early labour market experiences, the surveys gather a wealth of information on education training, personal characteristics and earning estimations. In 1997, 21,824 randomly selected 1995 graduates were interviewed by telephone 2 years after graduation, representing 157,226 university students who graduated in 1995 (weighted). Similar surveys of the classes of 1982, 1986, and 1990 graduates were also conducted. For the purposes of this study, 13,183 graduates who obtained bachelor or ordinary degrees were selected, which represents 134,025 university graduates as the working sample (weighted).

Classification of fields of study

We select the variable ‘Major field of study code for the studies completed’ as a secondary criterion for filtering the data and selecting cases. As a result, liberal or vocational fields of study are specifically linked to university programmes.

It should be noted that most researchers directly use the variable ‘Fields of Study’ from Statistics Canada.² However, the variable does not reflect programmes that are oriented to liberal/vocational fields. In other words, it is not clear which field is directly linked to a job, and which one is not. For example, under the category of ‘fine arts and humanities’, the fields ‘fine arts’, ‘Applied Arts’, ‘English literature’, and ‘translation’ are all included. Conventional wisdom would classify these fields as liberal education. However, ‘Applied Arts’ and ‘translation’ are actually vocational fields. To avoid the



Table 1 Classification of liberal and vocational education (USIS)

<i>Liberal</i>	<i>Vocational</i>
I. <i>Liberal Arts/Social Sciences</i>	III. <i>Education</i>
8 Fine arts	1 Teaching
9 Music	2 Education support
14 Classics, classical and dead languages	3 Physical education and recreation
15 History	5 Counselling services
18 English language and literature	35 Social work and social services
19 French language and literature	37 Specialized administration studies
20 Other languages and literature	38 Commerce/business
21 Philosophy	39 Secretarial science — general fields
22 Religious studies	47 Household science and related fields
23 Other humanities	
25 Anthropology	IV. <i>Applied Arts/Social Sciences</i>
28 Economics	10 Performing arts
29 Geography	12 Graphic arts, audio/visual arts and design
32 Political science	16 Library and records science
33 Psychology	17 Mass media studies
34 Sociology	27 Area studies (non-languages or literatures)
36 Other social Sciences	30 Law and jurisprudence
100 Arts, N.E.C.	31 Man/environment studies
II. <i>Liberal Sciences</i>	V. <i>Applied Sciences</i>
26 Archaeology	48 Veterinary medicine/science
40 Agricultural science	52 Architecture
43 Biochemistry	53 Aeronautical and aerospace engineering
44 Biology	54 Chemical engineering
45 Biophysics	55 Civil engineering
46 Botany	56 Design/systems engineering
49 Zoology	57 Electronic and electrical engineering
92 Chemistry	58 Industrial engineering
93 Geology	59 Mechanical engineering
94 Math, actuarial science	60 Mining and metallurgical engineering
98 Physics	
99 Arts and sciences, N.E.C.	
101 Sciences, N.E.C.	
	61 Engineering — other
	62 Engineering science
	63 Forestry, fisheries and wildlife management
	64 Landscape architecture
	76 Dentistry
	77 Medicine — general
	78 Medicine — basic medical science
	79 Medical specialties (non-surgical)
	80 Paraclinical sciences
	82 Nursing
	84 Optometry
	85 Pharmacy and pharmaceutical sciences
	86 Public health
	87 Rehabilitation medicine and therapy
	88 Medical laboratory and treatment tech
	90 Other health professions, sciences and tech
	91 Computer science
	96 Meteorology
	97 Oceanography



confusion, the new variable, fields of study, was created. Based on University Student Information System (USIS) Field of Study Codes, Table 1 lists the five major categories of fields of study as: (1) Liberal Arts and Social Sciences, (2) Liberal Sciences, (3) Education, (4) Applied Arts and Social Sciences, and (5) Applied Sciences. To address how university students have responded to the changing workplace through selecting fields of study, either in liberal or vocational areas, the five fields of study are regrouped, so that (1) and (2) are merged as liberal, and (3)–(5) are combined as vocational. The fields of study will be separately analysed by educational background at the university entry level (e.g. entry from high school, college and trade-vocational school, or university).

School–Work Transitions

The role of structure and agency

In examining the implications of fields of study choice, the first task is to determine the roles of agency — defined in this paper as choice of a liberal or vocational field of study — and structure in predicting labour market outcomes. We assume that social structural variables will influence labour market outcomes. However, we also expect agency to be a salient factor in determining those outcomes. Table 2 presents results from the regression of structural and agency variables on the factor score generated from selected labour market outcomes indicators.

The results indicate that structural variables are related to labour market outcomes. Most of the variation in the factor scores is captured by the age variable. To the extent that age acts as a proxy for greater life experience and work experience, we anticipate that any index of labour market position will be sensitive to this individual variable difference. While the remaining structural variables are somewhat displaced by age, there is obvious predictive strength in gender and father's educational level. Gender patterns in fields of study choice are well established and frequently parallel employment preferences and constraints in the labour force (Bakker, 1991). Regional effects focused on Quebec likely reflect the unique relation between that province's post-secondary institutions and the labour market (Jones, 1997). Of particular interest to this study is the significant position of fields of study choice in the equation. This result indicates that agency does play a role in determining the labour market position of graduates, at least for the period covered by the NGS.

Table 3 reveals the relation between structure–agency and labour market outcomes in terms of liberal and vocational fields of study. When evaluated in terms of structural indicators, the overall returns to an investment in education



Table 2 Regression for labour market outcomes with structure and agency variables (class of 1995)

<i>Independent variable</i>	<i>Dependent variable</i>		
	<i>Factor score: labour market outcomes</i>		
	β	<i>s.e.</i>	<i>t</i>
Female	-0.02*	0.019	-2.9
Age	0.46*	0.001	57.9
Visible minority	-0.02	0.029	-1.9
Mothers' education	0.01	0.019	1.4
Father's education	-0.04*	0.015	-4.4
Quebec	0.09*	0.033	7.3
Ontario	0.03	0.032	2.4
West	0.03	0.034	2.1
Liberal fields of study	-0.03*	0.019	-4.3
(constant)		0.054	-35.4

Notes: 1. Dummy variables, sex: female = 1, male = 0; ethnicity: visible minority = 1, other = 0; fields of study: liberal = 1, vocational = 0.

2. For regression with labour market outcomes: multiple $R=0.491$, $R^2=0.241$, $F=464.8$, $P<0.01$.

3. * β significant at $P<0.01$.

are clearly greater for vocational graduates than for those who chose the liberal stream. There are, however, some interesting differences within each of the liberal and vocational categories. Proportionately, more females choose the vocational stream.³ A significant segment of female vocational enrolment is found in faculties of education. In both liberal and vocational fields of study, visible minorities fare worse in the school-work transition than do non-visible minorities. Anisef *et al.* (1999a-d) report a similar finding although there were some notable exceptions across fields of study in that study. Father's education can be considered an indicator of the availability of family cultural and social capital that presumably offers both post-secondary and labour market advantages (Andres, 1993). However, we identified stronger outcomes for those respondents whose parents had lower levels of education. Conceivably, this disadvantage in family capital is offset by a greater motivation to succeed. In any event, the finding is consistent with more general studies of social position that find social origin diminishing in importance beyond the high school years (Anisef *et al.*, 2000). Regional differences are noted between Quebec and other provinces but not further explored in this paper.

Relation between fields of study and labour market outcomes

The previous analyses established the role of agency (fields of study choice) in shaping labour market outcomes. In this section, we undertake a closer

Table 3 Social structure and labour market outcomes by fields of study (class of 1995)

<i>Independent variable</i>	<i>Dependent variable</i>					
	<i>Liberal</i>			<i>Vocational</i>		
	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>
Sex						
Male	2.84	2001	1.38	3.28	3163	1.36
Female	2.74	3613	1.40	3.08	4372	1.43
Age						
24 or less	2.62	3823	1.31	2.88	4053	1.33
25 and older	3.10	1794	1.49	3.49	3488	1.42
Ethnicity						
Visible minority	2.67	598	1.25	3.05	840	1.36
Non-visible minority	2.77	4248	1.41	3.18	5769	1.42
Mother's education						
Less than child's education	2.83	4201	1.41	3.18	6046	1.42
Equal to child's education	2.58	875	1.28	3.05	955	1.37
Higher than child's education	2.65	379	1.34	3.07	303	1.37
Father's education						
Less than child's education	2.84	3702	1.42	3.24	5246	1.42
Equal to child's education	2.70	957	1.35	2.97	1207	1.36
Higher than child's education	2.61	756	1.26	3.04	746	1.38
Region of origin						
Atlantic	2.46	496	1.30	2.80	601	1.36
Quebec	2.93	1137	1.47	3.31	2886	1.47
Ontario	2.78	2586	1.39	3.03	2280	1.35
West	2.78	1274	1.34	3.21	1678	1.35

Notes: 1. Mother's education and father's education are the variables to compare with child's education.

2. Factor scores are presented as quintiles.

examination of the relation between fields of study and labour market outcomes. Comparisons of the latter are made between liberal and vocational fields of study categories. As well, a more detailed account of outcomes is given by exploring the liberal and vocational categories to include Liberal Arts and Social Sciences, Liberal Sciences; as well as Education, Applied Arts and Social Sciences, and Applied Sciences.

Table 4 provides an overview of outcomes in terms of the five general fields of study categories that were described previously. Liberal Arts and Social Science graduates do less well than Liberal Science graduates on nearly all criteria. Graduates in Applied Sciences earned significantly higher incomes (\$32,641) than graduates in Liberal Arts and Social Sciences (\$19,592), Liberal



Table 4 Fields of study choice and summary of outcomes, the class of 1995, 1997

Class	Class 1995						
	<i>FJEARN</i>	<i>LFSTAT97</i>	<i>Jobcl97</i>	<i>C28</i>	<i>C35</i>	<i>C36</i>	<i>K21</i>
<i>Variable</i>	<i>Income</i>	<i>UR^a</i>	<i>Job full</i>	<i>Job</i>	<i>Job closely</i>	<i>Very</i>	<i>Select same</i>
<i>Fields of study</i>			<i>time</i>	<i>permanent</i>	<i>related to</i>	<i>satisfied</i>	<i>FOS? (yes)</i>
<i>(five categories)</i>					<i>studies</i>	<i>with job</i>	
Liberal arts/social sciences	\$19,592	12.3	74.5	69.9	24.3	35.3	62.1
Liberal sciences	\$22,105	13.3	82.8	64.9	35.8	39.7	62.0
Education	\$24,047	5.3	75.2	58.4	69.3	55.3	79.6
Applied arts/social sciences	\$26,648	9.3	90.9	79.9	55.8	39.9	76.5
Applied science	\$32,641	5.9	90.6	81.7	68.5	46.2	80.6
Overall average	\$24,474	9.3	82.1	71.6	49.5	42.7	71.6

^aUR stands for unemployment rates that exclude the graduates who were not in the labour force. All the above indicators refer to the job in the reference week (May–June, 1997).

Sciences (\$22,105), Education (\$24,047) or Applied Arts and Social Sciences (\$26,648). Graduates in Education (5.3%) and Applied Sciences (5.9%) had the lowest unemployment rates, while graduates in Liberal Sciences experienced the highest level of unemployment (13.3%); they were followed closely by graduates in Liberal Arts and Social Sciences (12.3%). Graduates in the Applied Arts and Social Sciences and Applied Sciences were also more likely to locate full-time/permanent employment than graduates in other fields.

Education graduates at the time of graduation faced a very restricted job market and this is evident in the amount of part-time, temporary work they received. Graduates from Education (69.3%) and Applied Sciences (68.5%) were the most likely to claim that their jobs was closely related to their previous studies, while graduates in Liberal Arts and Social Sciences (24.3%) were the least likely to express this sentiment. Consistent with these findings was the degree of satisfaction expressed by graduates. Thus, graduates in education were the most satisfied (55.3%), while graduates in Liberal Arts and Social Sciences appeared the least satisfied (35.3%). Graduates in Liberal Arts and Social Sciences were more likely to experience negative labour market returns. Finally, gradates in Applied Sciences (80.6%) and Education (79.6%) appeared to be most committed to their fields of study, indicating that they select these fields again. Liberal Science (62.0%) and Liberal Arts and Social Science graduates were the least likely to report that they would repeat their fields of study.

Table 5 presents the initial liberal–vocational comparison of employment, income, continuity and stability, and job satisfaction. Quite clearly, the returns to vocational graduates exceed those of liberal graduates. Income is over \$7000

Table 5 Fields of study and labour market outcomes (two categories)

<i>Fields</i>	<i>Liberal (%)</i>	<i>Vocational (%)</i>
<i>Labour force status</i>		
Employed	87.5	92.9
Unemployed	12.5	7.1
Column total	4820	7111
<i>Annual job income</i>		
Mean	\$20,156	\$27,521
Standard deviation	\$13,399	\$15,828
Column total	4244	6013
<i>Is the job full time ($\geq 30h$ per week) or part time?</i>		
Full time	76.2	85.8
Part time	23.8	14.2
Column total	4146	6544
<i>Is the job permanent or temporary?</i>		
Permanent	68.8	73.3
Temporary	31.2	26.7
Column total	3878	6179
<i>Job satisfaction</i>		
Very dissatisfied	2.9	1.6
Dissatisfied	12.2	7.8
Satisfied	48.7	43.8
Very satisfied	36.2	46.8
Column total	3870	6192

higher; and the employment situation of vocational graduates is better — they suffer half the unemployment and half the part-time work status as compared to liberal graduates. They also have a markedly lower rate of temporary employment. These advantages result in higher levels of job satisfaction, although not in proportion to the objective indicators of their employment situation.

Our examination of the direct links between fields of study choice and labour market outcomes does not support previous research on university preparation for the workforce, which tends to favour the more liberally educated graduate, at least at the baccalaureate level. This apparent anomaly between study findings may be attributed to the limited time interval between graduation and the collection of NGS data. Thus, the labour market differences found in our study may alter with time. Indeed, the work of Allen suggests they will diminish and even reverse. Nevertheless, in the context of the school–work transition period examined in this study, labour market outcomes do favour vocational graduates.



Employability Skills

Employability skills have been identified as important in the post-industrial workplace by the Conference Board of Canada (1998). These comprise communication skills (writing and speaking); interpersonal skills (working effectively with others, and leading/supervising others); and innovative skills (critical thinking, solving problems, and learning and using new technology).

The previous analysis gave some indication of how graduates are differentially rewarded in the market place. We found clear evidence that the labour market favours vocational over liberal graduates. To explore further the basis for these differences, we introduce the second question: Do the employability skills possessed, acquired, and utilized by university graduates enrolled in liberal and vocational fields of study differ significantly?

An assessment of the employability skills among university graduates is based on three components: possession, acquisition, and utilization. Skills possession indicates graduates' belief that these skills are already in place; skills acquisition refers to their assessment of the degree to which they learned skills as a consequence of their university education; and skills utilization refers to the opportunity graduates have within their current employment to apply such skills.

Employability skills possession

Table 6 sets out the graduates' ratings of the extent to which they possess the listed employability skills in relation to the different labour market outcomes of liberal and vocational graduates. The mean ratings shown in the table reveal there is very little difference between the groups.

Table 7 shows the ratings across the five fields of study comprising the liberal and vocational categories, and reinforces the finding of uniformity in skill ratings. There appear to be differences among the five fields of study in terms of these skill areas. However, what variability exists is present both within and across the broad groupings of fields. For example, Liberal Arts graduates rate themselves higher than Applied Arts graduates, but Education graduates offer higher ratings than either. Education graduates are, however, consistently different in the social skills area — leadership and inter-personal relationships. This is, perhaps, to be expected as faculties of education emphasize these areas and, more importantly, provide opportunities for their students to practice these skills in their student-teaching practica.

The finding of little or no difference between the liberal and vocational groups is somewhat surprising given the vociferousness of the debate surrounding liberal and vocational education and the related debate around

Table 6 Fields of study and employability skills possession (two categories)

<i>Skills possession^a</i>	<i>Fields of study</i>								
	<i>Liberal</i>			<i>Vocational</i>			<i>Total</i>		
	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>
Writing (m01)	3.32	5551	0.7	3.20	7441	0.73	3.25	12,992	0.72
Critical thinking (m09)	3.27	5545	0.69	3.26	7445	0.67	3.27	12,990	0.68
Solve problems (m13)	3.13	5535	0.69	3.18	7432	0.67	3.16	12,967	0.68
Work effectively with others (m21)	3.36	5533	0.72	3.38	7432	0.69	3.37	12,965	0.7
Lead/supervise others (m25)	2.94	5409	0.79	2.94	7083	0.79	2.94	12,492	0.79
Ability to learn and use new technology (m29)	3.05	5461	0.85	3.15	7383	0.81	3.11	12,845	0.83

^aThe variables are recoded in a reversed order, 1 = not very good, 2 = good, 3 = very good, and 4 = excellent, so a higher score indicates a higher level of skill.

Table 7 Fields of study and employability skills possession (five categories)

	<i>Fields of study</i>														
	<i>Liberal Arts/Social Sciences</i>			<i>Liberal Sciences</i>			<i>Education</i>			<i>Applied Arts/Social Sciences</i>			<i>Applied Sciences</i>		
	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>
m01	3.35	4314	0.68	3.2	1237	0.76	3.33	2330	0.68	3.18	2987	0.74	3.07	2125	0.76
m09	3.25	4308	0.69	3.31	1237	0.7	3.26	2330	0.66	3.25	2993	0.68	3.29	2122	0.67
m13	3.10	4299	0.69	3.24	1236	0.69	3.18	2323	0.68	3.14	2985	0.66	3.23	2124	0.67
m21	3.37	4298	0.72	3.31	1235	0.72	3.50	2322	0.62	3.35	2986	0.71	3.31	2123	0.71
m25	2.96	4197	0.78	2.86	1211	0.81	3.16	2217	0.76	2.88	2819	0.78	2.78	2047	0.77
m29	3.04	3193	0.99	3.02	809	0.98	3.41	1979	0.84	2.99	2345	1.00	3.08	1727	0.89

m01 = writing; m09 = critical thinking; m13 = solve problems; m21 = work effectively with others; m25 = lead/supervise others; m29 = ability to learn and use new technology.



developing a broad knowledge rather than a more obviously job-relevant set of skills.

Employability skills acquisition

Employability skills acquisition provides us with a measure of whether universities are adequately preparing their graduates for effective school–work transitions. Some employers (or employers’ groups) tend to be critical of all aspects of the university’s role in preparing graduates for employment, effectively limiting the potential of forming a partnership (Fisher *et al.*, 1994; CAUT, 2000).

Table 8 outlines graduates’ attributions of their employability skills. The ratings are moderately high, suggesting that universities — in both liberal and vocational fields of study — play a role in forming these skills. This is especially the case in the intellectual sphere: composing one’s thoughts in written form, solving problems, and thinking critically. Universities are relatively less effective in providing opportunities for students to acquire skills in teamwork and leadership. In addition, university education is viewed by graduates as not having adequately prepared students with advanced technological skills.

Table 9 provides a more concentrated look at the variation in skills imparted to graduates. Across the five fields of study contained in the table, one can see a greater variation in graduates’ assessment of their university experience. These differences are not, however, obvious between the fields of study that comprise liberal and vocational categories.

Utilization of employability skills

In order to gain some sense of the extent to which graduates’ skills are utilized in the labour force, we have constructed tables of graduates’ reported use of employability skills in their work. These are the same skills previously evaluated and allow a comparison to be made between possession, acquisition, and utilization. Table 10 indicates that employability skill utilization differs dramatically between liberal and vocational graduates. The only skill that is comparable in their utilization is ‘Working effectively with others’. In all other cases, vocational graduates perceive that they employ their skills to a much greater degree than liberal graduates.

Table 11 provides a more detailed profile describing the extent to which graduates were able to apply employability skills in their work. These disaggregated results strongly confirm the previous distinction found between liberal and vocational groups. Only in the social domain (work effectively with

Table 8 Fields of study and employability skills acquisition^a (two categories)

<i>Skills acquisition</i>	<i>Fields of study</i>								
	<i>Liberal</i>			<i>Vocational</i>			<i>Total</i>		
	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>
Writing (m02)	3.46	5512	0.69	3.28	7372	0.77	3.36	12,884	0.74
Critical thinking (m010)	3.45	5504	0.63	3.35	7408	0.68	3.39	12,911	0.66
Solve problems (m14)	3.15	5501	0.73	3.20	7410	0.73	3.18	12,911	0.73
Work effectively with others (m22)	2.74	5483	0.93	2.90	7406	0.91	2.83	12,889	0.92
Lead/supervise others (m26)	2.57	5281	0.97	2.66	6901	0.92	2.62	12,182	0.94
Ability to learn and use new technology (m30)	2.77	5238	0.99	2.87	7177	0.93	2.83	12,415	0.96

^aThe question is 'To what extent did you get this ability from your education or training?' The variables are recoded in which 1 = not at all, 2 = not much, 3 = to some extent, and 4 = to a great extent.

Notes: The variables of employability skills are recoded in a reversed order, 1 = not very good, 2 = good, 3 = very good, and 4 = excellent, so a high score indicates a high level of skills.

Table 9 Fields of study and employability skills acquisition (five categories)

	<i>Fields of study</i>														
	<i>Liberal Arts/Social Sciences</i>			<i>Liberal Sciences</i>			<i>Education</i>			<i>Applied Arts/Social Sciences</i>			<i>Applied Sciences</i>		
	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>
m02	3.51	4285	0.65	3.27	1228	0.78	3.37	2328	0.76	3.29	2957	0.74	3.17	2087	0.82
m10	3.45	4274	0.63	3.44	1230	0.63	3.29	2315	0.71	3.36	2973	0.66	3.39	2119	0.66
m14	3.10	4266	0.73	3.35	1235	0.66	3.06	2307	0.78	3.18	2982	0.69	3.36	2120	0.68
m22	2.72	4257	0.93	2.80	1226	0.91	2.91	2320	0.89	2.90	2972	0.95	2.88	2114	0.89
m26	2.59	4110	0.97	2.52	1171	0.96	2.81	2192	0.89	2.59	2729	0.94	2.61	1980	0.91
m30	2.67	4046	1.01	3.12	1192	0.84	2.78	2178	0.97	2.79	2911	0.94	3.07	2088	0.83

m02 = writing; m10 = critical thinking; m14 = solve problems; m22 = work effectively with others; m26 = lead/supervise others; m30 = ability to learn and use new technology.

Table 10 Fields of study and employability skills utilization (two categories)

<i>Skills utilization^a</i>	<i>Fields of study</i>								
	<i>Liberal</i>			<i>Vocational</i>			<i>Total</i>		
	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>
Writing (m04)	3.06	4137	1.02	3.37	6475	0.83	3.25	10,612	0.92
Critical thinking (m012)	3.32	4132	0.87	3.59	6500	0.67	3.49	10,632	0.77
Solve problems (m16)	3.39	4129	0.77	3.58	6510	0.64	3.5	10,639	0.7
Work effectively with others (m24)	3.66	4122	0.62	3.67	6503	0.6	3.66	10,625	0.6
Lead/supervise others (m28)	3.03	4003	0.99	3.15	6051	0.94	3.11	10,054	0.96
Ability to learn and use new technology (m32)	3.26	3958	0.84	3.37	6310	0.75	3.33	10,267	0.78

^aThe variables of employability skills are recoded in a reversed order, 1 = not very good, 2 = good, 3 = very good, and 4 = excellent, so a high score indicates a high level of skills.

Table 11 Fields of study and employability skills utilisation (five categories)

	<i>Fields of study</i>														
	<i>Liberal Arts/Social Sciences</i>			<i>Liberal Sciences</i>			<i>Education</i>			<i>Applied Arts/Social Sciences</i>			<i>Applied Sciences</i>		
	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>	<i>Mean</i>	<i>N</i>	<i>s.d.</i>
m04	3.06	3294	1.02	3.05	843	1.01	3.43	2105	0.83	3.35	2554	0.84	3.34	1816	0.79
m12	3.3	3282	0.88	3.4	850	0.84	3.53	2095	0.74	3.57	2563	0.67	3.7	1842	0.58
m16	3.37	3278	0.77	3.46	850	0.76	3.57	2087	0.66	3.5	2580	0.66	3.68	1843	0.56
m24	3.66	3282	0.61	3.63	840	0.64	3.72	2099	0.55	3.61	2564	0.64	3.68	1840	0.58
m28	3.04	3193	0.99	3.02	809	0.98	3.41	1979	0.84	2.99	2345	1.00	3.08	1727	0.89
m32	3.25	3134	0.84	3.32	823	0.82	3.28	1971	0.78	3.38	2522	0.75	3.46	1817	0.68

Notes: m04 = writing; m12 = critical thinking; m16 = solve problems; m24 = work effectively with others; m28 = lead/supervise others; m32 = ability to learn and use new technology.

others) do liberal graduates approach the vocational graduates in having opportunities to apply their skill.

The analyses of skill possession, acquisition, and utilization suggest a number of possibilities: that the workplace affords liberal graduates few opportunities to engage their skills; that universities fail to properly equip these graduates, forcing them to rely on their own ability; or that employers fail to make the best use of talents possessed by liberal graduates (whether imparted by the university or not). To the extent employers determine the working conditions and tasks of their employees, it appears they may misread the signals available to them in the liberal education credential conferred by universities on their graduates. Simply put, employers may not be sufficiently aware and involved in the curriculum of the university. We will examine this possibility in the following section by examining outcomes for graduates of both liberal and vocational streams who participated in a cooperative education programme. Cooperative education programmes are a form of alternation training or ‘work experience’. They require extensive communication between the university and the employer or company that is participating as a partner in such an arrangement. Employers typically have a better understanding of the university and the student; and similarly, university faculty become more aware of the priorities and particular cultural requirements of the business or service communities.

University–Employer Relationships: The Role of Co-op Education

Our analysis suggests that vocational and liberal graduates do not differ significantly in their perceived possession of employability skills nor in their view that these skills can be attributed to their university education. Yet, liberal graduates do report that they have fewer opportunities to use them in the workplace.

One possible reason for this anomaly is the stronger affiliation between employers and the more vocationally oriented university faculties (e.g. engineering). This would be consistent with Rosenbaum’s (1999) elaboration of signal theory. In this paradigm, a school-to-work transition system must provide not only training but should also convey trustworthy *signals* about the capacities and competencies of students. Often the quality of information about the employability value of students is problematic. We suggest that relatively poorer labour market outcomes for liberal graduates are in part due to a blockage of trustworthy signals between liberal graduates and employers.

To examine this possibility further we compare the labour market outcomes of liberal and vocational graduates involved in co-op education programmes. We assume that co-op education brings both employers and (future) graduates



Table 12 Co-op education and labour market outcomes by fields of study

<i>Fields of study</i>	<i>Liberal</i>		<i>Vocational</i>	
	<i>Co-op program?</i>			
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
<i>Labour force status</i>				
Employed	91.7	87.4	92.9	92.9
Unemployed	8.3	12.6	7.1	7.1
Column total	169	4650	621	6484
<i>Annual job income</i>				
Mean	\$29,054	\$19,792	\$31,938	\$27,084
s.d.	\$14,282	\$13,234	\$15,340	\$15,815
Column total	167	4077	545	5463
<i>Is the job full time ($\geq 30h$ per week) or part time?</i>				
Full time	95.3	75.5	97.0	84.7
Part time	4.7	24.5	3.0	15.3
Column total	148	3999	575	5962
<i>Is the job permanent or temporary?</i>				
Permanent	83.9	68.3	87.5	71.9
Temporary	16.1	31.7	12.5	28.1
Column total	137	3740	553	5626
<i>Job satisfaction</i>				
Very dissatisfied	0.7	3.0	1.6	1.6
Dissatisfied	4.3	12.5	6.1	7.9
Satisfied	42.4	48.9	41.2	44.1
Very satisfied	52.5	35.6	51.1	46.3
Column total	139	3733	554	5637

into closer contact and enhances the employer's awareness and appreciation of students' repertoire of skills. The results presented in Table 12 are positive for both liberal and vocational co-op education participants. However, the labour market outcomes are particularly striking for liberal co-op graduates. When compared to non-participants, this group received substantively greater employment benefits and expressed higher levels of job satisfaction. It should be noted that the proportion of liberal education graduates who were involved in co-op programmes was not large and considerably lower (3.5%) than the proportion of vocational graduates (10.9%). This suggests the need to exercise caution with these findings. Nevertheless, to the extent that co-op education provides employers

with better signals regarding students' work habits and employability skills, participation in co-op programmes appears to moderate field of study disparities in labour market outcomes.

Discussion

The analysis of labour market data for the Class of 1995 demonstrates the utility of employing a structured individualization approach to describe the labour market outcomes of university graduates, outcomes that result from individual choice and experience (fields of study) and influenced by demographic, cultural, and structural influences. Through the use of regression analysis, we have been able to demonstrate that these influences account for a substantial amount of the explained variance in labour market outcomes. More specifically, we find that gender, age, father's education, provincial residence of graduates prior to enrolment, and field of study all significantly contribute to our understanding of variations in labour market outcomes. Rather than thinking of structural factors and individual choice as forces that exert independent effects on labour market outcomes (e.g. wages, job satisfaction), it is best we understand that these factors work in tandem or in a combined fashion to affect the career pathways of university students, once they graduate and leave the academy. Both types of factors are important in their own right and operate mutually to influence short-run labour market outcomes.

Pivotal to this analysis of labour market outcomes among university graduates has been our assumption that field of study choice — viewed as an indicator of personal agency among university students — would help us better understand differences in labour market outcomes. Furthermore, detailed fields of study were classified as both a dichotomy (liberal and vocational) and also into five major categories (Liberal Arts and Social Sciences, Liberal Sciences, education, Applied Arts and Social Sciences and Applied Science). Given the debate in the literature concerning the relative merits of a liberal or vocational education, we made the assumption that liberal and vocational fields impart different cognitive skills and that these skills relate to the positive and negative labour market experiences of university graduates. The labour market favours vocational over liberal graduates with regard to labour force status, employment income and status, job permanence, and job satisfaction. In all instances, vocational graduates enjoy significantly greater labour market returns than liberal education graduates.

We then turned to testing our assumption regarding the skills acquired by liberal education and vocational graduates. In examining the area of skills, we worked with six items: the ability of writing clearly and precisely, the ability to analyse and think critically, the ability to work effectively with others, the



ability to lead or supervise others, and the ability to learn and use new technology on the job. All items were conceptualized as appropriate measures of employability skills. When graduates were asked whether they had developed any of the six employability-related skills described above, clearly discernible differences in the possession of such skills could be identified in only two out of six instances, with respect to writing clearly and concisely, and the ability to learn and use new technology. Liberal education graduates were more likely than vocational graduates to maintain that they had developed good writing skills. In contrast, vocational graduates were more likely to argue they possessed the ability to learn and use new technology. These differences are quite plausible given the curricular differences that characterize liberal and vocational education fields of study. Generally, Liberal Arts graduates are afforded more of an opportunity to write in their courses and, all else being equal, more effective writers will be selected into liberal fields of study. Conversely, vocational fields are also more likely to recruit university students with an ability to learn and use new technology and to provide them with opportunities to sharpen such acquired abilities. What needs to be underscored though is the surprising lack of difference between liberal and vocational graduates in their overall possession of employability skills. Given the strong and consistent differences in labour market outcomes between liberal and vocational graduates, we anticipated similar differences in employability skills across these groups. This raises an important question that requires further research: If university graduates in different fields of study believe that they have developed similar skills or abilities in school or at work, then to what do employers respond when they offer graduates in vocational fields of study substantially better labour market returns than graduates in liberal fields? In examining the relation of field of study, employability skills, and labour market outcomes, clearly we need to attend not only to the preparation of university students but also to the relationship of employers to graduates and to the universities in which they train. This suggests that study of the school-to-work transition requires attention to students, universities (including faculty), and employers. A key reason that accounts for student's work entry difficulties is poor and untrustworthy information, rather than the amount of information available (1999, 236–237).

In respect of the relationship of employers and university graduates, these results suggest employers are more likely to trust signals provided by vocational graduates over those offered by liberal graduates. This probably reflects the more formalized network in vocational fields of study that link employers, students, and the larger university. For employers, to recruit graduates of vocational programmes on university campuses has become part of institutionalized practice. Often university faculty teaching such programmes sustain strong contacts with potential employers as well. Typically,

these practices are not found in liberal fields of study, with the exception of a limited number of co-op programmes. With co-op programmes, there is also the development of teacher–employer linkages and employer–university relationships. Such bonds provide an effective means of conveying information about the work habits of students — information generally difficult to communicate through objective methods. As long as teachers are trusted to convey accurate assessments, such interactions are effective ways of fostering trust in ratings (Rosenbaum, 1999, 258).

Our analysis was based on self-report data by university graduates. Hence, reported differences in skills and their utilization depend on the perceptions of graduates alone. Similar information from employers — including analyses of recruitment patterns and the rationale for hiring — would provide a more balanced account of the school-to-work transition. Furthermore, this paper explores initial transitions (2 years after graduation) of the university graduates. Monitoring long-term effects of liberal and vocational education is needed since discernable career benefits of a liberal education have been revealed in recent census studies (e.g. Axelrod, Anisef and Lin, 2001).

Policy Research Implications

The empirical findings of this study suggest several policy considerations for improving the school–work transitions of university graduates. First, the selection of a field of study by students contains an element of risk. The selection process has significant implications for labour market success, but the pathways beyond graduation are not predictable. The labour market changes continually, with great variation in occupational employment growth and capacity. One of the keys to dealing with such uncertainty is to provide students with comprehensive career-related information before they make their fields of study choices. The Federal Government’s *Job Futures* initiative represents one such attempt to inform students about the nature of specific jobs, their career prospects, and the necessary educational antecedents. Effective high school career advising is also essential. Increasingly, school counsellors work with parents to inform and facilitate family efforts to marshal the resources needed for post-secondary education (Sweet *et al.*, 2000). Relevant and intelligible information about the intellectual requirements and employment potential of university fields of study is essential for individuals and their families who have to choose among educational institutions and programmes (Hossler *et al.*, 1999).

A second area of concern involves the relatively unfavourable labour market outcomes of liberal graduates who possess employability skills similar to those of vocational graduates. Despite reporting possession of similar levels of skill,



liberal education graduates are afforded significantly less opportunity to utilize these skills in the workplace. Moreover, liberal graduates are disadvantaged in terms of their initial salaries and wages: as a group they earn less than their vocational counterparts. This is almost certainly related to differences in the value employers accord the skills of vocational and liberal graduates. Despite the fact that liberal graduates improve their economic position in the labour force at a faster rate than do vocational graduates (e.g. Axelrod *et al.*, 2001), they are initially disadvantaged by the recruitment practices of employers. The rhetoric surrounding employability skills is seemingly inconsistent with the specific vocational skills employers actively seek in their employees (Berryman, 1993; Darrah, 1994; Rosenbaum and Binder, 1997). To some extent this situation is a result of labour market demands. The shortage of graduates with specific vocational skills and knowledge — especially in fields such as electrical engineering and other computer-related areas — has created demand pressures with commensurate wage premiums as well as favourable conditions of work.

Some provincial governments (notably Ontario) are responding directly to the need for technical skills by funding university programmes most in demand by industry. While many universities comply with this imperative, others are moving to create more effective bridges between liberal graduates and their potential employers. Co-op programmes are one effective strategy for passing trustworthy signals between graduates and employers. It would appear, in fact, that many universities have embraced the co-op concept, applying it with particular vigour to their liberal education programmes. The University of British Columbia is one example: by 2003 it plans to provide all its undergraduates — including those from liberal fields of study — with co-op placements. The success of cooperative education programmes such as this depends on coordinating provincial government (funding) policies with institutional initiatives.

Related to the need for field experience described above is a third policy consideration — universities should provide students in liberal fields with more situated learning opportunities. The reform of curriculum and instructional design improvements are familiar pursuits at most universities. These are usually undertaken through offices of instructional improvement and are aimed at the classroom activities and practices of professors in an attempt to move away from the traditional lecture format. Underlying the recent instructional reforms are perspectives on ‘student-centred’ learning (Prawat, 1992; Norman and Schmidt, 1992; Kaufman *et al.*, 1997). These emphasize the need for learning in context, acknowledge the importance of the learner’s prior experience, and attempt to engage students in active, participatory learning. They also emphasize the necessity for social exchange in learning, often using cooperative learning circles to create the necessary interaction.

The instructional designs that reflect these principles are much better than traditional lecture methods to ground theory in the realities of students' lives (including their current and future work) as well as fostering the employability skills discussed earlier.

Fourth, it is essential to raise awareness among employers that liberal graduates do not differ markedly from their vocational graduate counterparts in terms of the employability skills they possess. They do, however, need to be provided with opportunities to prove their mettle on-the-job. This effort to raise awareness would involve, at a minimum, greater dissemination of the results of this and similar research studies to employer groups across the country.

In concluding this article on the relation between labour market outcomes and university fields of study, we would emphasize that the analysis presents only a partial (economic) picture of the issues involved. A broader understanding of the policy implications requires consideration, first, of the motivations of students who act autonomously in selecting their fields of study and in defining their career goals. Students choose educational pathways for a variety of reasons, and the decision process doubtless involves a rational accounting of the returns to investment in post-secondary education. But it also represents an expression of personal interest, preference, and highly individual definitions of 'meaningful' work. The force of personal preference and agency in the choice process is explored by Raudenbush and Kassim (1999) in relation to women's participation in post-secondary education. Further research of this sort is needed to determine the complex nature of individual choice in the progression from school to work.

A second consideration requires that the function of liberal education in the university curriculum be considered in relation to the diverse roles institutions must play in an era of mass education. To the extent that universities have undertaken the task of educating significant numbers of the population (both young and old), they must serve both the intellectual and instrumental needs of their graduates. As previously suggested, research on the 'vocationalizing' of the university curriculum must attend to curricular and instructional design issues; but if policy discussions and decisions are to be adequately informed, research also needs to be extended and broadened to include analyses of the economic, cultural, and social implications of change.

The debate over the purpose and value of a university education is frequently presented as a dichotomy in which the personal, cultural, and social values of a liberal education are pitted against the instrumental 'market' values of a vocational education. This contrast is sometimes necessary to defend both the monetary and non-monetary returns to a liberal education. As typically implemented, however, the university curriculum does not involve an absolute division between liberal and vocational programmes. The Liberal Arts



comprise the intellectual foundation of the university, and students enrolled in (baccalaureate level) education, engineering, nursing, and other vocational fields are at least exposed to this influence through elective course work. And for many professional programmes an arts and sciences degree is a prerequisite. The effectiveness with which universities pursue their mandate to cultivate an informed and critical intelligence in all their graduates and the degree to which this purpose is under threat by provincial politicians with a wholly market orientation and agenda is nevertheless of great concern. We conclude with a quote from Axelrod *et al.* (2001):

Overall, liberal arts graduates have succeeded in the world of employment, though the future for students in these and others fields, as always, cannot be predicted with certainty. We contend that liberal education is the core of higher learning — in good economic times and bad — and in its effort to prepare people for employment, the university must not be permitted to raze its own intellectual and cultural foundations. Liberal education has a vital place in arts and science courses, and in innovatively designed professional and vocational programs. In any event, the liberal arts are not static; they continue to be reformed, but less in response to ephemeral market trends than on the basis of evolving intellectual currents. As employers themselves have periodically asserted, by broadening the knowledge base of employees, liberal education can enhance the abilities of graduates in applied fields and enrich society as a whole. As they develop programs and allocate resources, policy makers would be well advised to heed this advice. So, too, would students as they plan their academic and occupational careers (pp 24–25).

1 This project was funded, in part, by Applied Research Branch, Strategic Policy, Human Resources Development Canada (HRDC). We acknowledge helpful comments by Patrice de Broucker (Chief, Integration, Analysis, and Special Projects Section), Hans Schuetze of the University of British Columbia and anonymous reviewers. We thank Shelley Harris for her research assistance.

2 FOS is usually classified as Education, Fine Arts, Humanities, Social Sciences, Commerce, Agriculture/Biology, Engineering, Nursing, Other Health, Math/Physical Science.

3 In terms of absolute numbers, however, there are more females in the vocational stream. This reflects the majority of females in university undergraduate education in Canada.

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