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Content

1. ABSTRACT
2. INTRODUCTION
3. "POST-INDUSTRIAL/KNOWLEDGE ECONOMY" THEORIES
4. THE KNOWLEDGE SOCIETY: PYRAMIDS AND ICEBERGS OF LEARNING
5. THE GROWTH OF UNDEREMPLOYMENT
6. THE LIMITS OF HUMAN CAPITAL THEORY
7. THE RETOOLING OF HUMAN CAPITAL THEORY
8. CONFLICT THEORIES OF KNOWLEDGE AND WORK
9. CLASS AND THE PERFORMANCE GAP
10. CONCLUDING REMARKS
11. NOTES
12. References

1. ABSTRACT

Human capital theory, the dominant approach to explaining education-employment relations, posits that greater individual and aggregate investments in learning activities lead to greater individual and societal economic benefits. However, the learning efforts of the potential labor force (in terms of formal schooling, further education and informal learning) now appear to far exceed opportunities to apply employment-related knowledge in advanced industrial societies. There is mounting empirical evidence of widespread underemployment. In spite of retooling efforts, human capital theory remains fixated on individualistic market relations and unable to deal with the general problem of underutilization of investment in learning. An alternative theoretical perspective which emphasizes power dimensions of learning and work relations rather than further educational investments is suggested to address the underemployment problem.

Earnings greatly understate the social productivity of college graduates (and other educated persons) because they are (allegedly) only partly compensated for their effect on the development and spread of economic knowledge. (Gary Becker 1964, p. 209)

The current employment situation entails an enormous waste of resources and an unacceptable level of human suffering. It has led to growing social exclusion, rising inequality between and within nations, and a host of social ills. It is thus both morally unacceptable and economically irrational. (Michael Hansenne, Director-General, International Labor Office, 1995, p. 93).

□

2. INTRODUCTION

One of the most common mistakes of human reasoning is to make false generalizations from individual examples. A familiar instance is the "Horatio Alger myth." This is the belief that because a few individuals have been able to ascend from lowly social origins to become very rich, anyone else could do it too if they only exerted the same effort. Generalizing from individual cases to aggregate conditions without carefully assessing the representativeness of the individuals and the overall situation they face is to commit a fallacy of composition error of logic. While there has been substantial upward and downward mobility in advanced industrial societies (Turner, 1992), a dominant tendency persists for those with vested interests in existing institutional structures to exaggerate the extent of upward mobility by pointing to exceptional individual cases. I will argue that this error of logic is inherent in *human capital theory*, the currently dominant perspective for explaining relations between education and employment, because of its narrow and presumptive focus on individual educational investments.

During the post-World War II expansionary era, investment in formal education was associated with both higher individual earnings and growing societal wealth. These relationships have been extensively conceptualized and documented by human capital theory which stresses the value of peoples' learning capacities as a factor of economic productivity (Becker, 1964). This perspective is built on the intellectual foundations of neo-classical market theory and the generally optimistic assumptions of the evolutionary progress paradigm (see Livingstone, 1999, pp. 134-137). It reflected the post-WWII conditions of simultaneous expansion of employment and education fairly well, even though Berg (1970) and others documented the existence of a significant performance gap in the 1950s. The 'learning-earning' link may still be valid at the individual level, although with diminishing marginal utility. But it is disintegrating at the aggregate or societal level and this disintegration is occurring beyond the margins of the market returns perspective of human capital theory.

We are now living in a knowledge society, in the sense that people in general are devoting more time to learning new knowledge and skills than ever before. But as this aggregate knowledge increases, the opportunities to apply it in paid workplaces have not kept pace. As I will document, the underemployment of adults' relevant knowledge in contemporary employment is a large and growing problem. The notion of "knowledge-based economy" remains largely illusory for most of the labor force. In response to these conditions, there have been several attempts to retool human capital theory without contesting its underlying individualistic fallacy or recognizing the pervasive phenomenon of underemployment. In this paper, I will critically assess claims for a knowledge economy, document the growth of both a knowledge society and underemployment, identify specific limits of conventional human capital theory, briefly review efforts to retool this theory, and suggest an alternative theoretical perspective which pays greater attention to power dimensions of learning-employment relations. □

3. "POST-INDUSTRIAL/KNOWLEDGE ECONOMY" THEORIES

As promoted most notably by Daniel Bell (1964, 1973) in the U.S., John Porter (1971) in Canada, Alain Touraine (1969) in France and Radovan Richta (1969) in eastern Europe,¹ post-industrial theory anticipated the growing centrality of theoretical knowledge, continuing expansion of tertiary-level occupations, the increasing eminence of a professional and technical class, and a general upgrading of the skills needed for employment, as well as greater leisure time. Similar assumptions have been taken up uncritically by many more recent advocates of the "knowledge economy" (e.g. Marshall and Tucker, 1992; Stewart, 1997). This mode of thought serves to glorify the capacities of technocrats/experts themselves and resonates with increasing attempts by professional experts in many fields to monopolize knowledge that many others are capable of mastering and using (Derber, Schwartz and Magrass 1990; Perkins 1996; Parenti 1996). This is surely one reason why, in spite of demonstrated empirical inadequacies and withering critiques from other researchers, post-industrial/knowledge economy advocates continue to assert the increasing pervasiveness of scientific knowledge and upgraded skills in the workplace.²

The theories of post-industrialism have promoted the belief that the prevalence of information processing over material handling in the mode of production would necessitate skill upgrading and greater creativity and critical thinking of workers. In short, post-industrial/ knowledge economy theories generally assume or assert that *workers increasingly require more skill, become more involved in planning their own work, and increasingly constitute a professional class.*

There have certainly been substantial changes in the *composition* of the employed workforce over the past generation in nearly all market economies. Most obviously, there has been sectoral decline of manufacturing and relative growth of personal, financial and social service employment. This is the pivot point for most "post-industrial" projections. Other evident compositional shifts have been the relative increase of part-time and temporary jobs, and greater participation of married women in paid employment (see OECD 1994). But in relation to these compositional shifts, empirical researchers have been at least as likely to posit

deskilling, less planning involvement and poorer compensation as their post-industrial opposites. Indeed, for virtually every aspect of contemporary paid work, advocates of degradation theses rather than post-industrial upgrading trends can be easily found in the research literature. Part of the difficulty in assessing levels and changes in actual work requirements has been that our customary ways of thinking about these requirements do not clearly distinguish between the technical tasks involved and the people doing them.

A balanced assessment of the contemporary character of and trends in paid work requirements should directly consider: (1) the *technical division of labor* in terms of the allocation of simple and complex tasks between jobs; (2) the *social division of labor* in terms of the respective participation of various workers in planning the execution of tasks; and (3) their consequential effects on the *class structure of paid work*.³

Overall, the weight of available North American empirical evidence suggests that there has indeed been a net upgrading of the technical skill requirements of the job structure since the 1940s. But the most substantial gains occurred prior to 1960 and the slight upgrading that is discernible since then reveals the related upgrading claims of most post-industrial/knowledge economy theorists to be quite exaggerated.

With regard to the social division of labor, comparative analyses suggest that the extent of skill utilization in the workplace is a function of the social bargains that have been struck and continue to be negotiated between employers and employees rather than any immutable trend. The success of the Japanese model of collective capitalism versus the American model of managerial capitalism (see Lazonick, 1991) in increasing productivity and the consequent "Japanese challenge" in established markets of American firms provoked increasing management receptivity to experiment with new forms of industrial relations in the U.S., just as the post WWII reconstruction and the "American challenge" did previously in Europe (Servan-Schrieber 1971). While the roots of managerial capitalism run deep in North America, even here shifts to new social divisions of labor that require increased worker input have been underway for some time at levels ranging from business organizational strategies to specific job redesign (Kochan and Useem 1992). But such shifts to greater worker involvement in production decisions appear to have been very gradual and limited to date.

So what effects have these continuities and changes in the technical and social divisions of labor had on the occupational class structure? Overall, the changing class structure is probably associated with gradually increasing skill requirements for paid work in most advanced private market economies. Daniel Bell's professional class is increasing, but very slowly. Working class jobs with narrow technical task requirements and very limited social authority continue to constitute the numerically predominant class position. The so-called "post-industrial era" does not appear to have produced the oft-claimed more interesting and fulfilling paid work for burgeoning numbers of professional experts and other knowledge workers. Certainly the proliferation of information technology has not produced the more pleasurable work for all that advocates like Bell had projected (see Kumar, 1995). These trends are much more modest than the visions of a knowledge-based economy initially expressed by post-industrial theorists in the early 1960s projected, and especially modest in comparison with the massive expansion of peoples' efforts to acquire knowledge. □

4. THE KNOWLEDGE SOCIETY: PYRAMIDS AND ICEBERGS OF LEARNING

We can distinguish three types of learning among adults: formal schooling, further education courses, and informal learning.⁴ The incidence of all three appears to have increased very significantly in the post-1970 period in all advanced industrial societies. I will present empirical evidence from Canada here because we have recently conducted the first national survey of adult informal learning done anywhere in the past 20 years (see NALL, 1998).⁵ But similar trends in formal schooling and further education have been documented elsewhere as well (see Livingstone, 1999, pp. 12-51).

Participation in all forms of schooling and further education has increased dramatically in Canada over the past two generations. High school completion has increased rapidly. The proportion of the labor force with less than high school completion dropped from nearly half to around a quarter between the 1970s and the 1990s (see Livingstone, 1999, Tables 1.2 and 1.4). Only about 15% of current youth cohorts are not obtaining a high school diploma either through continuous enrolment or after "stopping out." Post-secondary enrollments have grown even more rapidly, particularly since the creation of community colleges in the 1960s. Between 1981 and 1996, participation of the actual 20 to 24 age cohort in post-secondary educational institutions in Canada doubled, so that about a third of this cohort is now enrolled, one of the world's highest participation rates (Betcherman et al., 1998).

The annual participation rate in adult further education **courses** circa 1960 was about 4% of the entire adult Canadian population. By the early 1990s, it was about

30% (Livingstone, 1999, Table 1.6). So within a period of about thirty years there was an increase of about six or seven times in the participation rate. This was still lower than the participation rates in many European countries. The 1998 NALL survey finds that participation in adult education and training courses and workshops continues to grow in Canada and that the popular demand for greater future provision of further education courses is even stronger. In summary, nearly half of the increasingly highly schooled Canadian adult population is now actively engaged in taking further education and training courses or other forms of continuing education, the majority are planning to take further education courses in the near future, and even more would do so if their prior learning achievements were recognized. Most Canadian adults now believe they have quite sufficient learning skills to benefit from further education courses, but many of those who would like to participate in further education face serious institutional or personal constraints on doing so (e.g. McEwen, 1998).

The NALL 1998 survey confirms that adult learning is like an iceberg--mostly invisible at the surface and immense in its submerged informal aspects. The survey assesses participation in four aspects of informal learning: employment related; community volunteer work related; household work related; and other general interest related. In each aspect, respondents were asked about informal learning activities on several specific themes. The basic findings are as follows. Those in the current labor force or expecting to be soon (about 2/3 of the total sample) now average about 6 hours a week in informal learning related to their current or prospective future employment, including new general job/career knowledge, computer learning, and occupational health and safety. Those involved in household work over the past year (around 90%) have averaged about 5 hours per week in informal learning related to their household work, including home renovations and gardening, home cooking and home maintenance. Those who have been involved in community work over past years (over 40%) devote about four hours a week on average to community related informal learning, including interpersonal skills, communication skills, social issues and organizational/managerial skills. Most people also engage in some other types of informal learning related to their general interests. Those who do so (around 90%) spend on average about 6 hours a week on these learning activities. The most common ones are learning about health and well being, environmental issues, finances, hobby skills, social skills, public issues, computers, sports and recreation.

Nearly all Canadian adults (over 95%) are involved in some form of informal learning activities that they can identify as significant. The survey provides estimates of the total amount of time that all Canadians are spending in all four areas (employment, community, household, and general interest). The average number of hours devoted to informal learning activities by all Canadian adults over the past year was around 15 hours per week. **This is vastly more time than Canadian adults are spending in organized education courses** (an average of around 4 hours per week if we include the entire population). The iceberg metaphor is not exact but close enough.

Prior Canadian case studies and U.S. surveys of self-directed learning activities in the 1970s found averages of 10 hours or less per week (see Livingstone, 1999, Table 1.7, p. 36). Ontario surveys which contain comparable items have found that the incidence of informal learning activities increased from 12 to 15 hours between 1996 and late 1998 (Livingstone, Hart and Davie, 1999). While measuring the iceberg of informal learning remains an elusive task, the available evidence suggests that the amount of time adults are devoting to informal learning appears to have increased significantly in recent years. There is great variation in the total amount of informal learning that Canadian adults say they are now doing. But clearly, the overwhelming majority of Canadian adults are now spending a significant and recognizable amount of time regularly in these pursuits.

Prior studies of informal learning have found more variation within most social groupings (such as age, sex, level of schooling, income, ethnic groups) than between them (see Tough, 1971, 1978). The 1998 NALL survey also finds this general pattern across most of these social differences, as well as across occupational classes. In particular, those with the least schooling appear to be devoting at least as much time on average to most forms of informal learning as those with higher levels of schooling.

This lack of difference across major social groups is an extremely important finding for comprehending the full character of our knowledge society. Anyone can engage in informal learning on their own volition and schedule, and apparently people in socially disadvantaged statuses are just as likely to do so as those in the most socially dominant positions (although the most oppressed people may have less discretionary time beyond necessary employment and household work to engage in informal learning activities). The submerged informal part of the iceberg of adult learning does not have the same hierarchical structure as the exposed pyramid of organized education. While we are really still at the "ether stage" of understanding the processes and outcomes of informal learning, case studies of the actual learning practices of adults with limited formal education--such as recent ethnographic research in the situated learning theory tradition (e.g. Engestrom, 1992)--strongly suggest that much of this learning involves quite high levels of skill competency. Much as it contradicts the dominant meritocratic ideology of our

"credential society," the less schooled are in many instances and significant dimensions of knowledge at least as competent as the more highly schooled. Investments in informal learning may have many motivations, but they are clearly not comprehended by the market reward calculus of human capital theory.

People in all advanced industrial societies are investing more time in formal schooling and further education than ever before. While there are few recent surveys to confirm it, the informal learning in which most adults invest much more of their learning time also appears to have increased significantly in recent years. If, as careful analyses of the skill requirements of the job structure suggest, the rapid rate of expansion of learning activity has not been matched by a comparable rate of expansion of demand for utilization of knowledge by workers, the logical conclusion would be that the underemployment of the acquired knowledge of the labor force must have increased.

5. THE GROWTH OF UNDEREMPLOYMENT

At least six dimensions of the underemployment of the knowledge and skills of the workforce may be distinguished in contemporary societies. These are: The talent use gap; structural unemployment; involuntary reduced employment; the credential gap; the performance gap; and subjective underemployment. I have documented the increasing incidence of underemployment on most of these dimensions elsewhere (see Livingstone, 1999, pp. 52-132). Here I will summarize the general findings on the performance gap, based on series of U.S. and Canadian surveys.

The performance gap refers to the extent to which job holders are able to use their achieved levels of skill and knowledge in actually performing their jobs. The most commonly used indicator of skill levels in the U.S. and Canada has been the general educational development (GED) scale. The GED scale is intended to embrace three dimensions of knowledge (i.e. reasoning, mathematical and language development) which are required of the worker for satisfactory job performance.

Several major attempts have been made in the U.S. to estimate the extent of correspondence between these performance requirements and the skills acquired through schooling (Eckhaus, 1964; Berg, 1970; Burris, 1983). Without going into the technicalities of the various estimating procedures here (see Livingstone, 1999, pp. 78-85), I will only note that all have found a substantial extent of aggregate-level underemployment of workers' actual levels of formal knowledge in relation to estimated job performance requirements.

The best available North American time-series data bases to assess recent levels and trends in educational attainments and performance requirements are the annual national surveys of the National Opinion Research Center (NORC) and the biennial Ontario surveys conducted by the Ontario Institute for Studies in Education at the University of Toronto (OISE/UT).⁶ The NORC survey reports from 1972 to 1990 include GED scores for occupations based on 1971 estimates.⁷ The 1980 to 1996 OISE/UT survey data on respondents' occupations have been assigned GED codes based on the coding scheme developed by Alf Hunter and his colleagues (Hunter and Manley 1986; Hunter 1988),⁸ from the Canadian Classification and Dictionary of Occupations for the 1971 census. Applying the various GED-based measures to these data sets produces estimates of the actual level of performance underemployment in both the U.S. and Ontario of between a quarter and three-quarters of the employed labor force, and most likely between 40 and 60 percent.

I have conducted trend analyses for both the U.S. and Ontario surveys using all previously established measures. The general trends are similar for all measures. The results using Ivar Berg's (1970) initial measure are presented in Table 1. The extent of performance underemployment appears to have increased during the periods of these surveys. According to the Berg measure, there was a gradual increase from 46 percent to over 60 percent of the employed U.S. labor force being underemployed between 1972 and 1990; the comparable figures for Ontario suggest an increase from 44 percent underemployment to just under 60 percent between 1980 and 1996, a slightly shorter but more recent period. According to this measure, performance underemployment has now become a majority condition for the North American labor force.

Other studies, not based on GED measures, have found that, since the early 1970s, almost a third of the employed North American workforce have had work-related skills that they could use in their jobs but have not been permitted to do so; this actual underuse appears to have grown to include over 40 percent of the entire workforce in the 1990s.⁹

In spite of much rhetoric about skill deficiencies of the current workforce, there is still little evidence of any general and persistent technical skill deficit among employed workers. A recent survey by the National Center on the Educational Quality of the Workforce (1995) has found that U.S. employers consider over 80 percent of their employees to be fully technically proficient in their current jobs, and that most employers are more concerned with prospective employees' attitudes than their industry-based skills or prior school performance. The basic point is that the performance gap between educational attainments and actual technical job skill requirements in North America is extensive and increasing on all available measures.

In spite of the increasing performance gap and widespread conditions of underemployment on other dimensions as well, there is very substantial unfulfilled demand for access to further education courses among the less affluent and especially among the underemployed (Livingstone, 1999, pp. 97-132). A large and increasing majority of people now regard an advanced education as very important to get along

Table 1 Trends in Performance Underemployment Levels, U.S. 1972-1990 and Ontario 1980-1996 (using Berg1)

	United States (%)																	
	72	73	74	75	76	77	78	80	82	83	84	85	86	87	88	89	90	
Underemployed	46	49	53	51	57	52	55	55	59	57	59	56	57	58	59	59	62	

Matched	31	31	23	31	26	30	30	31	31	29	29	31	30	28	28	29	29
Underqualified (N=768-1166)	23	20	19	18	17	18	15	14	11	14	12	13	13	14	13	13	12
	Ontario (%)																
	80	82	84	86	88	90	92	94	96								
Underemployed	44	43	50	51	52	54	58	55	57								
Matched	29	34	28	33	31	30	31	32	27								
Underqualified (N=526-715)	27	23	22	16	17	16	10	13	16								

Sources: Davis and Smith (1994) and OISE Survey of Educational Issues Data Archive.

in society (Livingstone, Hart and Davie, 1999). Access to further education programs is clearly the institutional key to responding to adult demand for knowledge. But, as Table 2 summarizes, in spite of large gains in the educational attainments of lower social classes, the differences between actual and desired participation in further education still vary greatly between occupational classes. □

Table 2 Schooling, Further Education, Interest in PLAR* Credit and Incidence of Informal Learning by Occupational Class, Canada, 1998

	Occupational University Course/ Interest in Informal	Class Degree (%) Workshop Courses if Learning	Last Year PLAR (%)	(%) (Hrs/week)
Corporate executives**	70	71	61	17
Small employers	40	52	58	16
Self-employed	28	52	69	14
Managers	52	72	62	13
Professionals	76	76	69	15
Service workers	12	54	73	17
Industrial workers	8	37	73	17
Unemployed	16	38	82	20
Totals	26	46	70	15

* PLAR= prior learning assessment and recognition.

** Special supplementary sample, Ontario only (Livingstone et al, 1999).

Occupational class differences in the incidence of different types of adult learning activities confirm the existence of a massive egalitarian informal learning society hidden beneath the pyramidal class structured forms of schooling and further education. The incidence of informal learning among workers and the unemployed is at least as great as among more affluent and highly schooled classes. Corporate executives, managers and professional employees have much higher levels of formal schooling than working class people and are also more likely to have participated in further education courses or workshops last year. However, they are not more likely than the working classes to want to take courses if they receive recognition for their prior informal learning. The gap between current and desired participation is very much greater for working class people. The pent up demand for further education among the less affluent may have been as much ignored as their extensive informal learning activities.

While less than five percent of the active labor force feel underqualified for their current jobs according to this survey, nearly 40 percent feel at least moderate pressure from employers to engage in further employment-related learning on their own time, and around half of the further education courses they take are required by their employers (NALL, 1998). So, it appears that credential inflation does not cease with initial job entry, but that many job holders continue to acquire more skills that they may not be able to apply in their present jobs—either to hold on to these jobs or in the hope that they will eventually get better ones.

The capacity of paid workplaces to utilize people's knowledge has become increasingly problematic. As a consequence of their presumption of the increasing centrality of scientific/technological knowledge and general skill upgrading of the workplace, post-industrial/knowledge economy theorists have continued to ignore most aspects of underemployment, most notably the performance gap. With increasing underemployment, human capital theorists' related claims about connections between investment in learning and workplace rewards have also become less credible. □

6. THE LIMITS OF HUMAN CAPITAL THEORY

The most influential explanation currently on offer to account specifically for education-job relations is *human capital theory*. The core thesis is that peoples' learning capacities are comparable to other natural resources involved in the capitalist production process; when the resource is effectively exploited the results are profitable both for the enterprise and for society as a whole. From its inception in the United States after World War II, human capital theory tended to equate workers' knowledge levels primarily with their levels of formal schooling, to rely on quantitative indices of amount of schooling in estimating individual economic returns to learning, and to infer that more schooling would lead to higher productivity and macroeconomic growth (e.g. Schultz 1963; Becker 1964). Throughout the post-1945 expansionary era, the simultaneous increase of school participation rates and earned incomes in advanced industrial market economies lent apparent support to both the *individual and aggregate* dimensions of this perspective and encouraged the popular view that more schooling would inevitably lead to greater economic success.

The *individual* level relationship between educational attainment and income has remained strong in relative terms. In all advanced industrial market economies, university graduates have consistently earned significantly more than high school graduates since 1970 (see Livingstone, 1999, p. 163). Individual investment in higher education has therefore continued to represent a reasonable economic choice as long as the individual economic costs of obtaining it (in terms of tuition fees and deferred income) were not prohibitive.

However, simple earnings ratios do not tell the whole story. As Table 3 summarizes for the U.S. case, real wages in constant dollars are lower in the mid 1990s than they were in the early 1970s for all workers except those with advanced degrees. The wages of other college graduates have slowly climbed back to early 1970s levels but those of people without a college degree have continued to fall precipitously. The decline in wages for the non-college workforce may be attributable to many factors, including deunionization, a shift to low wage industries, a falling minimum wage, and import competition. But, as the evidence cited above indicates, this wage decline is unlikely to be related to the declining technical skill of the U.S. workforce. In any case, it is clear that the main cause of the growing wage gap between U.S. college graduates and less educated workers has been the decline of non-college workers' wages rather than any strong growth in the college wage (Mishel, Bernstein and Schmitt 1997, 170). □

Table 3 Change in Real Hourly Wage by Education, U.S. Labor Force, 1973-1995

Year	<High school	High school	Some college	College	Advanced degree
Hourly wage	(in 1995 dollars)				
1973	\$10.65	\$12.17	\$13.45	\$17.66	\$21.52
1979	10.59	11.86	12.92	16.55	20.34
1989	8.91	10.79	12.53	16.98	22.07
1995	8.16	10.46	11.64	17.26	22.81
Percent change					
1973-79	-0.6%	-2.6%	-3.9%	-6.3%	-5.5%
1979-89	-15.9	-9.0	-3.1	2.6	8.5
1989-95	-8.4	-3.0	-7.1	1.6	3.3
1989-95	-23.0	-11.8	-9.9	4.3	12.1

Source: Mishel, Bernstein and Schmitt (1997, Table 3.18).

More generally, while school enrolment rates continued to increase since the early 1970s, average incomes have stagnated, unemployment rates have fluctuated mainly upwards and underemployment of highly schooled people has been recognized as a social problem. The applicability of human capital theory's *aggregate* or societal-level "returns to learning" claims has been thrown into doubt. The belief that more education brings greater societal economic benefit has been a general article of faith in all post-industrial theories and cornerstone of human capital theories. The end of the post-WWII expansionary era in the early 1970s brought serious challenge to this belief. As Table 4 summarizes, real increases in average wages and benefits for the U.S. labor force as a whole virtually ceased during the 1970s while the average education and skill levels of the workforce continued to increase. Contrary to the precepts of human capital theory, collective investment in education has grown significantly while compensation growth has stagnated. □

Table 4 Hourly Compensation, Education and Skill Levels, U.S. Nonfarm Business Sector, 1948-1994

Year	Real Hourly Compensation (1992=100)	Average Years of Schooling	BLS Labor Skill Index* (1987=100)
1948	n/a	9.8	91.0
1959	61.5	10.5	94.7
1973	88.1	12.0	96.4
1979	95.4	12.5	96.5
1989	97.7	13.1	101.2
1994	98.4	13.4	105.0
Annual Growth			
1948-73	n/a	.8%	.2%
1959-73	2.6%	1.0	.1
1973-79	1.3	.7	.0

1979-89	.2	.5	.5
1989-94	.1	.5	.7

*The Bureau of Labor Skill Index is a broad measure of labor skill which reflects changes in the amount and economic value of experience and educational levels.

Source: Mishel, Bernstein and Schmitt (1997, Table B, 25).

During the same period, 1973 to 1995, the real U.S. Gross Domestic Product rose by nearly 40 percent, while real hourly wages of non-supervisory workers declined by about 15 percent; during the 1980s, virtually all of the earnings gains went to the top 20 percent of the workforce, two-thirds accruing to the top one percent of earners (Thurow 1996). Similar trends have been found in Canada (Morissette et al 1995). By the mid-1990s, the typical U.S. chief executive officer was making well over 100 times as much as the typical factory worker. This huge wage gap, far larger than in any other advanced industrial economy, had more than doubled since the 1970s (Sklar 1995, 11).¹⁰ But aside from the extraordinary gains of executives, the rising wage differential between college educated and non-college educated employees during the 1980s and 90s in the U.S. has been more the result of declining wages for the many than of increasing salaries for the few.

In this context of stagnant wages and continuing general increases in the education and skill levels of the overall workforce, the association between income and conventional measures of skill such as GED has been modest and declining. As Gittleman and Howell (1995, 423-27) document for the U.S. case in their 1973-90 analysis of six job quality "contours," the majority of "subordinate primary" contour blue collar workers who are unionized have been able to protect their wage levels far better than white collar service workers who have higher cognitive skill requirements in their jobs but who are rarely unionized; the poor, non-union "secondary" service and blue collar jobs that remained around 40 percent of U.S. jobs during the 1980s, and which employed very high proportions of blacks and Hispanics, saw *wage levels and most other aspects of job quality decline while occupants' education levels increased*. Earlier comparative analyses of skill and wage trends during the 1960-85 period found that low skill, high wage jobs were declining in the goods industries while service jobs with low wages but at least moderate skill levels were increasing (Howell and Wolff 1991). The growing weight of empirical evidence makes it clear that, rather than a "skill deficit," most working Americans are now experiencing a "wage deficit" (Sklar 1995, 28; Mishel and Teixeira 1991). The most highly educated work force in the world now works longer for less than do less educated but more unionized workers in other major industrialized countries (OECD 1994d, 22-23). □

7. THE RETOOLING OF HUMAN CAPITAL THEORY

Human capital theory clearly needs to be retooled. There have been at least three sorts of retooling efforts which focus, respectively, on stressing the relative individual benefits of schooling, enhancing the quality of schooling, and emphasizing the benefits of lifelong learning.

Adherents to the original human capital thesis have attempted to defend it against critiques that it has failed to take account of changing aggregate-level conditions, by focusing quite narrowly on documenting continuing *relative* economic benefits, especially the lower unemployment rates and relatively high earnings of those with higher formal credentials. The declining collective economic rewards for educational investment tend to be regarded as a continuation of only partial compensation through individual incomes and more intangible spin-off benefits for the general enrichment of civil society; so nations that have invested more in schooling are still considered ahead in global competition (Becker 1993, 1996). Recent sociological perspectives, such as Ulrich Beck's (1992) individualization theorem, that stress the disintegration of class commonalities and the rise of competition as the main mode of human interaction, offer some theoretical support for closer attention to individual training and job choices (see Timmerman 1995). But the narrowing of the empirical target to relative individual benefits simply ignores the biggest challenge to human capital theory, the evident societal underemployment of credentialed knowledge.

Secondly, some human capital advocates have suggested that declining or unimproving quality of schooling is now the central problem, and that by raising standards, starting earlier or providing more privatized or specialized forms, both human capital creation and economic growth can be rejuvenated (Beckman and Klenow 1997). Nobody would argue against continuing to try to improve the quality of educational services; but many would disagree that educational quality has in fact declined. Some human capital analysts offer more nuanced relative arguments for school reforms to enhance national productivity and economic competitiveness based on comparative studies of superior student performance in other countries, such as U.S. comparisons with Japan, Taiwan and China (Stevenson and Stigler 1992). But the general assumption is that the post-industrial/knowledge economy requires a leap in workers' skills and the schools must perform to higher standards to close the gap (e.g. Business Week 1988, 104). The focus is usually on the skills purportedly needed by "high performance" firms, and numerous innovative school reforms have been suggested to make the

schools more responsive to these needs and thereby close the gap (e.g. Berryman and Bailey 1992; Marshall and Tucker 1992; Resnick and Wirt 1996).

The claim that declining school quality is serving to depreciate human capital is typically made in terms of young people's falling performance levels on standardized tests. Such historical comparisons are often fraught with fallacy of composition errors of logic. That is, either average scores of entire current youth cohorts are compared with those of more restricted earlier enrollments, or specific bits of knowledge are used to argue an increasing general ignorance thesis. While most of these claims have now been systematically refuted (see especially Sandia Laboratories 1993; Berliner and Biddle 1995, 1996; Mishel et al. 1997, 182-84), they continue to be recycled in evermore selective forms. Of course, the curricula and pedagogies of current educational systems will change, and we can and should continue to try to improve them; raising standards, starting earlier and more relevant curriculum all remain worthy objectives. But rather than bemoaning decline from an idealized past, or becoming fixated on international league tables of current math scores, we should celebrate the fact that much larger and increasing proportions of today's young people are mastering much larger and increasing bodies of school knowledge (see Bracey, 1997). The recent purported crisis in adult illiteracy has also found little empirical basis (Livingstone, 1999, pp. 42-51). In sum, the evidence does not show any cumulative general decline in the quality of education. What it does show is that people of all ages in advanced industrial market economies are increasingly using their learning capacities more effectively through the institutions of organized education to gain greater amounts of knowledge. If the aggregate quality of schooling has not been shown to decline inter-generationally, this is a significant achievement in light of the massive increases in the proportion of the population participating and particularly the increasing proportions of non-English speaking entrants into the school system. Blaming the quality of the educational system for the breakdown of the aggregate learning-earning connection is like blaming the producer of any form of labor for employers' failure to utilize it. Do we blame the chef for the patron's failure to finish a well-cooked meal?

Thirdly, some popular revisionist approaches to human capital theory no longer focus on schooling but on "human capital externalities," such as lifelong job-related learning among workers (Lucas 1988; Romer 1994). The dynamic center of human capital creation is now seen to reside either in highly concentrated urban zones where "symbolic analysts" live, work and continually solve, identify and broker production problems (Reich 1991), or in "learning organizations" which create intellectual capital by facilitating collaborative problem solving within their workforces (Senge 1990; Nyhan 1991). The central empirical claim of human capital theory--that greater learning efforts are closely related to higher earning level--is resuscitated by downplaying schooling and emphasizing that effective employees must become continual adult learners in an increasingly globally competitive enterprise environment (OECD 1996).

The "learning organization" arguments of human capital revisionists like Reich and Senge, although largely rhetorical to date, begin to draw greater attention to aspects of learning previously ignored or taken for granted by human capital theory's earlier fixation on schooling and credentialed knowledge, namely the informal work-related learning of workers and their cumulative bodies of tacit knowledge. In some sense, we all know that substantial informal learning is essential to master a new job. Most employers rely heavily on informal on-the-job training. Prior studies have typically found that over 70 percent of job training is done through informal learning and the NALL 1998 survey offers further extensive evidence. However, these studies of work-related informal learning (see Livingstone, 1999, pp. 38-42) seriously undermine learning organization revisions of human capital theory, by exposing the lack of sustained relations between continued learning and earning for most workers.

As the NALL survey confirms, corporate executives, professional employees and service and industrial workers all now spend about the same amount of time in work-related informal learning. Human capital theory assumes that those who are more highly compensated are exercising greater learning capacities. But these results suggest that, at least in terms of informal learning time, the most poorly paid employees are devoting just as much effort to work-related learning in general as the most highly paid employers. Striking occupational class differences in the extent to which people get to use this acquired knowledge in their actual jobs have also been documented, especially in terms of the discrepancy between the *general work-related* informal learning and *job-specific* unpaid learning of service and industrial workers (see Livingstone, 1997). The fact is that large and growing numbers of people do substantial amounts of work-related informal learning throughout their working lives. But many either do not have the opportunity to apply this acquired knowledge in their paid workplaces or, if they can apply it informally, to be recognized and rewarded for doing so. The promoters of learning organizations have got it backwards. The challenge is not to facilitate more collaborative learning but to establish fair incentive structures, especially among service and industrial workers, to use and compensate the extensive amount of individual and collective informal learning that is already occurring.

Growing proportions of people who have invested many years of their lives in acquiring advanced formal educational qualifications are unable to obtain

commensurate jobs, as I have documented here in terms of the performance gap. The growing proportions of underemployed youths generally continue to try to realize their extensive educational investments in the job market, and even continue to make more such investments. The prospect of losing these investments through not being able to use them in the job market is again increasing (Krahn 1997). But, more generally, most people find diminishing credibility in human capital advocates' arguments that those with the most formal education are still likely to get good jobs, when they see so few of these to go around.

All of these efforts to repair human capital theory remain in jeopardy because of their failure to account for the growing general gap between peoples' increasing learning efforts and knowledge bases on the one hand, and the diminishing numbers of commensurate jobs to apply their increasing knowledge investments on the other. The cumulative evidence on the massive extent of both people's learning activities and their underemployment represents a major contradiction for human capital theory. Appeals to an immanent knowledge economy have limited credibility for those living in the education-jobs gap. The "learning for earning" thesis is increasingly reduced to a strategy for relative individual advantage and decreasing marginal returns. Human capital theory appears to have reached its limit as a rationale for increased social investment in education. □

8. CONFLICT THEORIES OF KNOWLEDGE AND WORK

It is interesting to note that human capital theory is in accord with the Marxist labor theory of value on the recognition of labor as the primary source of wealth in capitalist society. From 18th century physiocrats who imputed primary value creating capacity to the land up to contemporary monetarists, dominant economic theories have tended to diminish the role of labor in the creation of wealth. The limits of human capital theory, as suggested above, are its fixation with individual market transactions and blindness of macro-level underemployment. In Marxist terms, human capital theory is preoccupied with *value creation* while ignoring *value realization*. That is, human capital theory insists on the importance of investment in education, the imparting of value to the future laborer, but does not directly address the fact that this embodied value must be harnessed in the production of goods or services by labor power in order for the human capital invested to be realized. It is precisely this failure of value realization that constitutes the education-jobs gap.¹¹

A more adequate account of education-employment relations lies in understanding the basic social relationships that drive capitalist production systems and related learning practices. These relations are complex, contradictory and dynamic, in contrast to the simple, linear and immutable notions of more education for more skilled work and more earnings that underlie human capital theory.

I will suggest that conflict theories generally offer better insights into both workplace change and differences in people's development and uses of workplace-related knowledge and skill. Elsewhere I have critically reviewed contemporary Marxist and Weberian theories of education-work relations, most notably Bowles and Gintis' (1976) correspondence thesis, as well as Carnoy and Levin's (1985) contradictory demands thesis and Randall Collins' (1979) credential society thesis. I have then drawn on these perspectives to propose a more specific conflict theory of the education-jobs gap (Livingstone, 1999, pp. 173-225). This theory focuses primarily on class-based conflicts among employers, professional-managerial salaried employees, wage workers and the unemployed over knowledge and work requirements in advanced capitalist societies.

The strategies and structures of capital-labor relations in immediate production continue to be more contingent on the productivity/profitability of labor than they are on either capitalist control of labor or imperative and rapid skill upgrading. In view of the otherwise opposed interests of labor for democratic access to forces of knowledge production and of capital for privatized and hierarchical reproduction of commodified relations of knowledge production, educational systems are likely to assume a polytechnical character rather than a strictly vocational one; they are also likely to remain only loosely related to present capitalist production requirements. In any case, it is increasingly clear that class relations in education are mediated substantially beyond relations in production while class-based demands also interact with other social demands in the politics of education. Class effects in the knowledge production, governance and learning process spheres of education, therefore, cannot be accurately read off or derived from capitalist production relations. The education-jobs gap is likely to be class-specific in each of the several dimensions of under-employment, with variations subject to continuing contestations between major class groups across time and space.

From this general perspective, educational change is hardly an inevitable rational progression expressing the structural imperatives of capitalist production, nor is it merely the contingent expression of particular class conflicts. Rather, educational change is the indeterminate result of confrontations and negotiations between historically specific groups of class-based agents simultaneously constituted in gender and ethnic terms. These confrontations are grounded in different but

mutually-conditioned logics and the negotiations are mediated through previously institutionalized educational forms. We continue to make our own histories but in contested contexts not of our own choosing. This is the "contested subordination" perspective on learning-work relations that I propose as both theoretically coherent and empirically verifiable.¹²

In any private market-based economy, the sweep of change is continual. Inter-firm competition, technological innovation, and negotiations between employers and employees over working conditions, benefits and knowledge requirements all lead to incessant shifts in the numbers and types of jobs available. Population growth cycles, modified household needs and new legislative regulations also frequently serve to alter the supply of labor. At the same time, popular demand for general education and specialized training increases cumulatively as people generally seek more knowledge, different skills and added credentials in order to live and work in such a changing society.

So, there are always "mismatches" between employers' aggregate demand and requirements for employees on the one hand, and the aggregate supply and qualifications of job seekers on the other. The accelerating productivity of capitalist enterprises regularly throws workers into unemployment, reproducing the most evident part of the reserve army of labor. In societies with liberal democratic state regimes that acclaim the right to equal educational opportunity, and with labor markets in which both employers and job seekers make mainly individual employment choices, the dominant historical tendency has been for the supply of educationally qualified job seekers to exceed the demand for any given type of job. These same dynamics also generate formal underqualification of some workers, particularly older employees who have had few incentives to upgrade their skills and credentials.

In capitalist societies, as both Marxist class theorists and some Weberian social closure theorists (e.g. Murphy, 1988) recognize, the principal powers of definition and exclusion have accrued to those with the ownership of substantial private property. These powers generally have been accorded greater protection than other social rights by the legal and coercive sanctions of the state. This "deep structure of closure" (pp. 65-70), as Murphy calls it, and the related control of material resources by large capitalist owners and top private and state sector managers, profoundly limits the clear public expression of contending claims of competence, skill or value by those not allied with the interests of property owners. As Murphy (1988, p. 182) argues, more derivative and contingent forms of social closure such as those attempted by members of occupational specializations, have owed much of their success to their extent of complementarity with this deep structure. But established power structures should not be reified; they are continually subject to resistance and change, especially in response to the collective actions of well organized subordinate social groups.

Within this context, as neo-Weberian status competition theorists like Collins have illustrated, people in various occupational specialties manage to aggrandize the knowledge required for their own work and justify greater associated earnings than other workers through particularly certified credentials. Also, as Bourdieu and Passeron (1977) and Bernstein (1996) have best documented from dominant class standpoints, more general conflicts occur through the schools in every generation over the appropriate cultural content of knowledge. The traditional distinction between "intellectual" and "manual" labor may be better understood in terms of these position-shaping initiatives by mobilized occupational groups, in de facto alliances with capitalist class groups, than as accurate characterizations of deficient actual skills or learning capacities of manual workers; many working class people continue to resist such pejorative distinctions both at school and work (see Willis 1977; Browne 1981; Curtis et al. 1992).

On all of the above grounds, we should expect to find differential under-employment throughout the active labor force, but especially among those with the least economic and political power to define the appropriate requirements for their jobs or prospective jobs. In particular, we should expect to find higher levels of underemployment of their working knowledge among those in lower class positions, as well as among those social groupings whose general subordination in society has put them at a disadvantage in labor market negotiations, especially younger people, ethnic and racial minorities and women.

From this general theoretical perspective on the education-jobs gap, I have generated predictions about class-specific differences in the extent of under-employment on both the performance gap and five other dimensions of underemployment. Preliminary empirical tests support all of these predictions (see Livingstone, 1999, pp. 200-225). Here I will summarize the predictions and findings regarding the performance gap.□

9. CLASS AND THE PERFORMANCE GAP

The central congruent general prediction of both the neo-Marxist structural conflict theory of Carnoy and Levin (1985) and the neo-Weberian status competition theory of Collins (1979) is that the performance gap is likely to increase. In neo-Marxist terms this is because of the irresolvable contradiction between popular demand for more advanced education and the more restrictive requirements of hierarchical capitalist production systems; in Collins' neo-Weberian terms, it is because more and more specialized occupational groups try to impose elaborate credential regulations beyond the knowledge actually needed to do their types of jobs. I concur with both of these general arguments. As noted above, empirical research strongly suggests that there is a large and increasing *performance gap* in the workplaces of most advanced industrial market economies, in spite of gradual increases in technical skill requirements.

In class-specific terms, any performance gap that might exist for owners is likely to be quite small since business owners generally directly control their own working conditions. Once again, any discrepancies between their performance capacities and their chances to apply them are likely to be related to their enterprises' extent of control of market entry requirements, so corporate executives should have the lowest performance underemployment rates and the self-employed should have the highest among the owner classes. "Middle class" employees, including managers and professionals, are likely to experience at least moderate underemployment of their work-related knowledge, with the credentialed knowledge they have acquired to obtain their jobs in competitive labor markets sometimes exceeding what they actually need to perform them. Industrial and service workers, however, are likely to have considerably higher levels of performance underemployment. With the growing surplus of qualified job seekers in contemporary economies, workers generally have been unable either to effectively contest employers' hiring prerogatives to select more highly qualified applicants than jobs really need, or to prevent employers from keeping actual skill performance requirements substantially beneath workers' own knowledge capacities. Indeed, performance underemployment may increase in many working class jobs at the same time as the physical intensity of their workloads also increases.

The general Ontario profiles of performance underemployment by class position are summarized in Table 5, again based on Berg's initial GED-based estimates of the performance gap. As predicted, corporate executives have the lowest underemployment rates of all class groups; small employers and the self-employed have medium underemployment rates consistent with their lesser control of market entry. Managers and professionals exhibit similar medium levels of performance underemployment which are either slightly less than or overlap with the under-employment rates of small employers and the self-employed. Again as predicted and most significantly, *service and industrial workers of all skill levels consistently experience higher levels of performance underemployment than all other class groups*. Whatever GED-based measure is used, those employed in working class jobs are significantly more likely than those in most other class positions to have educational credentials that exceed the skill requirements of their jobs.

Younger people tend to experience higher levels of performance under-employment; those aged 18 to 24 are twice as likely to be overqualified for their jobs as those over 55. Both trend analysis and cross-sectional comparisons of age cohorts suggest that differences in performance underemployment between the working class and other classes are widening over time. For example, we can compare professional employees and skilled industrial workers, the working class group that has historically had the greatest organizational capacity to control their conditions of employment. While performance underemployment rates for professional employees remain fairly constant around 50 percent across age cohorts and over time, the rates for industrial workers increase from less than 50 percent among skilled industrial workers over 55 years of age to over 80 percent among workers aged 25 to 34. In contrast to post-industrial rhetoric about greater worker participation in the social division of labor, these findings indicate that the working class has been losing control over job performance requirements rather than gaining it in recent generations. □

Table 5 Class Position by Performance Gap, Ontario Labor Force, 1984-1996

Class Position	Berg1
Corporate executives*	17
Small employers	37
Self-employed	44
Managers	40
Professionals	50
<u>Service Workers</u>	
Skilled service	72
Other service	65
<u>Industrial Workers</u>	
Skilled industrial	56
Other industrial	63
Total labor force	52
N	5309

*Special supplementary samples of corporate executives (N=727)

Source: OISE Survey of Educational Issues Data Archive.

The most discernible sex differences in performance underemployment are among corporate executives. Corporate executives and skilled industrial workers are the two class positions that have remained almost exclusive male preserves as women increased their participation very significantly in all other forms of employment. The few women who have made it into the skilled trades appear to have been treated fairly, at least in the sense of not having to obtain higher qualifications than male tradespersons. But women who have made it into the board room have generally been extremely well qualified and remain much more likely to be underemployed than male executives. Visible minorities are somewhat more likely to experience performance underemployment than other ethnic groups, a difference that applies across all class positions.

Overall, the performance gap findings suggest that *the current organization of paid work wastes a substantial amount of peoples' work-related knowledge across the class structure*. While Collins (1979) does not offer quantitative estimates, his case studies strongly suggest high levels of performance underemployment among professionals. The present analysis indicates that there is an even greater waste of relevant knowledge in the working class, where the performance gap is now also increasing most rapidly.□

10. CONCLUDING REMARKS

The image of contemporary society inherent in post-industrial/knowledge economy and human capital theories proves illusory. While an aggregate upgrading of the technical skills needed for job performance is gradually occurring, our collective acquisition of work-related knowledge and credentials is far outpacing this incremental shift. Such underemployment is scarcely recognized in post-industrial and human capital theories, beyond the "frictional adjustment" that is regarded as natural in market economies.

The organizational structures of the workplace and the strategies used by employers and employees vary quite widely across current industrial market economies. There is nothing inevitable about development of the technical and social divisions of labor. The employment contract can be modified in various ways to include or exclude the knowledge and skills of the non-owning classes. The North American model of "managerial capitalism" is generally regarded as being quite exclusionary of the knowledge and skills of operative workers. While such models may well be gross simplifications of actual conditions, the high levels of performance underemployment documented here among the North American labor force are consistent with this model. It is becoming increasingly apparent that the connections between knowledge and work are mediated by the individual and collective negotiating powers of those in different class, gender, race and generational groups. Conflicts of interest between haves and have-nots need to be recognized as a starting point for understanding changes and continuities in the education-jobs gap.

The underlying dynamics of capitalist production-- inter-firm competition, the struggles between owners and employees over profits and wages, and the consequent revisions of production techniques--continually lead to changes in the specific organization of paid work, and provoke workers to continually learn more in order to be able to adapt to these changes and keep their jobs or try to find new ones. This new and different job-related information is not necessarily more complex or more advanced knowledge; much of what is occurring is job enlargement with increasing numbers and intensity of tasks, rather than job enrichment using more comprehensive knowledge systems in more discretionary ways. The education-jobs gap is primarily related not to educational deficiencies but to "job churning." In particular, under-employment of highly qualified workers is a systemic problem which is far more than an issue of "frictional adjustment."

The analyses presented here suggest that there has been extensive and increasing underemployment of the working knowledge of many well-qualified people throughout the past generation, especially in North America. The class analysis indicates that most objective dimensions of underemployment are lowest among corporate owners and professional-managerial employees, and most prevalent among the working class. The working knowledge of the North American working class is definitely underused in contemporary workplaces. Additional analyses indicate that underemployment is often greatest among young people and visible minorities, and sometimes among women; all these factors tend to heighten class differences in underemployment. Conversely, underemployment is generally lower among unionized workers than nonunion workers. All of these findings are consistent with a general conflict theory of underemployment of working knowledge that identifies the highest incidence with the least powerful social groups.

Further empirical research with different populations is clearly needed. But further studies in other times and places should keep in mind that these predictions refer to *relative* rather than absolute levels of underemployment. If the global capitalist economy enters another period of expansion, global levels of unemployment could fall and levels of underemployment on other dimensions could also fall because of enhanced bargaining power on the job for workers. In other words, under-employment is not a evolutionary phenomenon that irreversibly grows. It is continually subject to change on all dimensions through further contestation by various social groups. But as long as the underlying structure of power is grounded in capitalist property relations, working class people will remain most likely to experience objective underemployment.

Even if one is highly underemployed in objective terms, it may not be very useful to take critical action in response to this condition or even to recognize its existence, unless some *real vehicle* for practical effect is clearly available. Educational upgrading has been a practical individual response because it has improved relative chances of getting a decent job. But at the same time it has stimulated credential inflation and the impoverishment of relatively less credentialed workers who get squeezed out of the jobs race. Ultimately, educational upgrading becomes a less and less viable means of coping with objective underemployment. But all subjective and objective aspects of the education-jobs gap continue to be negotiated social relationships, subject to collective actions that can close or expand the gap fairly quickly. As the value of individual educational upgrading depreciates, the attraction of more collective alternatives, particularly alternative ways of organizing work, could well be increasing (see Livingstone, 1999, pp. 226-275). □

1. For my own early critique of the "post-industrial" perspective, Porter's rejoinder and my reply, see Livingstone (1972).
2. See Stehr (1994) for a recent revisionist overview of post-industrial/ knowledge *society* theories which attempts to respond to some critiques and recuperate the concept by formulating an explicitly non-evolutionary version which stresses its theoretical elasticity and transitional character, and with decidedly less emphasis on economic aspects of social relations than its predecessors.
3. For a detailed presentation of empirical evidence relating to each of these dimensions of paid work relations, see Livingstone (1999, pp. 139-162).
4. Informal learning includes any learning activities which we engage in, on our own and outside of the formal curricula of institutions providing educational programs, courses or workshops, in order to acquire understanding, know-ledge or skill. Informal learning is undertaken individually and collectively without externally imposed criteria or the presence of an institutionally authorized instructor.
5. The National Research network for New Approaches to Lifelong Learning (NALL) at OISE/UT has been funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) to identify the extent of adult learning, the existence of social barriers to learning, and more effective means of linking learning with work. The NALL survey of adults' current learning activities is the first large-scale survey in Canada and the most extensive one anywhere to date to attend to the full array of adults' learning activities, including informal learning as well as formal schooling and further education courses, and work activities, including community volunteer work and housework as well as paid employment. A representative telephone survey of 1562 Canadian adults was conducted for NALL by the Institute for Social Research at York University between June 6 and November 8, 1998. Respondents were asked about all aspects of learning and work, but with a special focus on informal learning. Those interested in further details about the interview schedule or the specific findings may visit the NALL website: <http://nall.oise.utoronto.ca>.
6. For detailed information on these surveys, see Davis and Smith (1994) and Livingstone, Hart and Davie (1997), respectively.
7. The specific estimates of GED levels used by the NORC in all its national surveys between 1972 and 1990, were developed by Lloyd Temme (1975) using the 1967 Dictionary of Occupational titles and the April, 1971 Current Population Survey. Burris (1983) used the NORC 1977-78 survey and these GED scores. I have used the 1972-90 surveys and the same GED scores for the estimates of the U.S. performance gap in the present study.
8. I am indebted to the late Alf Hunter for his generous provision of this coding scheme prior to publication of his own findings and his untimely passing.
9. Halaby (1994) offers a critique of GED-based measures of skill mismatch. He also presents an analysis of skill mismatch based on an alternative self-report question from the 1973 and 1977 Quality of Employment Surveys in the U.S. These surveys found a skill underuse rate of about 30 percent of the workforce (52). We have replicated the same question in the 1994 and 1996 OISE surveys and found rates of just over 40 percent; see Livingstone, Hart and Davie (1997, 73).
10. According to the OECD (1996), CEO:factory worker wage ratios for some relevant countries were as follows: U.S. 120; Canada 36; UK 33; Germany 21; Japan 16.
11. I am indebted to my colleague Wally Seccombe for developing this comparison.
12. This theoretical perspective on education-work relations is most decidedly not, as Rikowski (1996, 435) erroneously claims, an attempt: "to go back and rescue the old reproduction paradigm, and in doing so . . . attempting to bring an old discredited educational Marxist tradition back to life. . . . New directions. . . will be smothered by attempts (as in Livingstone) to resuscitate the old reproductionist perspective." I view Bowles and Gintis' (1976) as well as Althusser's (1971) reproductionist perspectives as provocative but fundamentally flawed. In fact, my theoretical intent is to help to resuscitate the much older tradition of recognition of the *contradictory relations* between the multifaceted development of laborers and the rigid capitalist forms of divisions of labor that Marx observed. Generations of educational Marxist scholars who have focused on superstructural analyses have served to smother this older tradition. While Rikowski himself claims to have developed a Marxist theory of the social production of labor-power, nowhere in his own extensive overview of Marxist educational theory since 1976 does he intimate any recognition of these contradictory relations or of the associated social problem of underemployment. □

12. References

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Human capital theory is concerned with knowledge and experiences of small-scale business owners. The general assumption is that the human capital of the founder improves small firms' chances of survival (Bruederl et al. 1992). Human capital acts as a resource. However, human capital theory studies usually assume that experiences are translated into knowledge and skills. This assumption is problematic, however, because length of experience is not necessarily a good predictor of expertise (Sonnetag 1995). Therefore, it is not surprising that human capital factors, such as length of manager Applications The theory of human capital has both planning utility and measurement utility. Consumer economics and financial planning often measures the value of current choices versus their long run returns and implications. Human Capital Theory allows individuals to make decisions about the inherent cost of future opportunities weighted with the opportunity cost of present situations. Human capital theory also introduces the investment risks of human capital theory including its illiquidity and assumptions about payback periods and opportunity cost. Again, human capital theory can be applied