Engineers' and Nurses' Current Perceptions of Working Conditions and Career Opportunities: Exploring General Professional Concerns and Potential Class Differences

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Abstract

More Canadians are working in professional jobs (Livingstone 2014). Since professional work has long been highly skilled, high-paying and secure, this appears to be good news for Canadian workers. There are signs, however, that the nature of professional work has been changing. As part of a broader study exploring changes to professions and work in Canada, we conducted interviews (n=23) with experienced nurses and engineers in Ontario and carried out a national survey (n=3,000). On the surface, these professions appear to provide excellent employment prospects. University graduates in engineering earn considerably more than their counterparts in most other disciplines. Reports of a nursing shortage in Canada suggest the potential for expanded labour market opportunities. However, our interviewees painted a more complex and possibly bleaker picture of current working conditions and career opportunities, one characterized increasingly by precarity, short-term contracts, and distinctive challenges associated with establishing professional careers. In this paper we explore the implications of recent workplace change for professional knowledge and skill acquisition. We argue there is evidence that professional knowledge is changing in fundamental ways.

Introduction

Canada, today, has a knowledge-based economy. Increasing proportions of jobs and of tasks in jobs involve processing information while declining proportions of jobs are in materials processing activities. Growing proportions of jobs are designated as professional, distinguished by forms of specialized knowledge. Professional work has historically been among the most privileged in the Canadian labour market, providing workers with good pay, job security, autonomy, and greater opportunity to utilize their capacities (Adams and Welsh 2007; Coburn 1994). While the expansion of professional work in Canada appears to provide good news for Canadian workers, scholars point to several troubling labour market trends including the

expansion of precarious work (Lewchuk et al. 2013), work intensification (LeFevre et al. 2015; Hart and Warren 2015), and credential inflation (Livingstone 2009), to name a few. The extent to which these challenges affect, and perhaps threaten to transform, professions in Canada has not been very fully explored. In this paper, we explore the changing nature of professional careers, and consider the impact of workplace and labour market change on professional knowledge and skill, through a case study of the well-established professions of engineering and nursing. We draw on interviews with 23 experienced professional practitioners, as well as national survey data on professions in the Canadian labour force, to consider the impact of workplace change on the depth and breadth of professional knowledge.

Literature Review

Since the 1980s, various scholars have identified challenges facing professions in Western societies, arguing that a confluence of forces and trends are undermining professional power. In the 1970s and 1980s, the 'deprofessionalization' thesis identified a two-front assault on the privileges of established professions (Haug 1975, 1980; Rothman 1984). On one front, it was claimed, professional workers' autonomy was being undermined by legislative change reducing professions' regulatory authority, and new management practices implemented in both public and private sector organizations, which aimed to achieve greater efficiencies and cut costs by controlling the professional workforce (Abel 2003; Coburn 1994; Dent 1993; Ritzer and Walczak 1988). On the other front, consumers have challenged established professions' knowledge claims, seeking improved access to services, and more choice, at a lower cost; technological change means consumers can do more for themselves (Haug 1975; Rothman 1984). Moreover, new and aspiring professional groups have challenged the privileged market

position of established professions, in order to expand the markets for their own services (Coburn 1994; Rothman 1984). These trends led some scholars to predict the end of professional work as we know it. Others acknowledged a decline in professional autonomy, but felt that professional workers were still in a privileged market and regulatory position, compared to most other workers (Abbott 1991; Freidson 1983, 2001).

The 'proletarianization' thesis emerged around the same time, and advanced similar arguments. Influenced by Harry Braverman (1974) and other labour process scholars, some argued that expert labour was undergoing proletarianization (Larson 1980; Coburn 1994). While in the nineteenth century, most professionals were self-employed, proponents of the proletarianization thesis argued that late-twentieth century professionals were predominantly employees. As such they were subject to the same alienation, exploitation, and declining autonomy experienced by other workers in a capitalist society (Coburn 1994; Ritzer and Walczak 1988). Of greater concern to these scholars, though, was the extent to which expert workers experienced deskilling. It was argued that professionals' work was becoming more routinized and fragmented. Not only were professional workers being forced to compromise their professional ethics to meet organizational goals for profit and efficiency, they were losing control over the content and execution of their work (Larson 1980; Coburn 1994). The characteristics that distinguished professionals from other workers were being whittled away.

Although the deprofessionalization and proletarianization arguments were compelling, empirical studies found little support for their assertions (Freidson 1983; Coburn 1994). Freidson (2001: 129) contended they were "more often hyperbole than analytically sound description." Coburn (1994) concurred: he found some evidence that medical doctors had experienced decreased autonomy, and increased routinization, but argued that they still had the

ability to control the content of their own work. In a similar vein, Abbott (1991) held that

professionals working in organizations exercised considerable skill and autonomy, and were not

as closely supervised as non-professional workers were (see also Lipartito and Miranti 1998).

Trends did, however, suggest increased internal stratification within professions that could

profoundly shape professional development moving forward (Freidson 1983; Abbott 1991).

Internal differences in authority and professional power were said to potentially undermine

professional unity (Freidson 1983).

Even though late twentieth-century scholars found little evidence of deprofessionalization

and proletarianization, they did identify real-world trends affecting professional workers. More

recent research on professional workplaces has continued to identify similar challenges. In fact,

there is a growing body of literature arguing that professions are no longer flexible and adaptable

enough for the changing knowledge economy where efficiency and cost-cutting are prioritized in

the public sector, while the private sector seeks to increase profit at any cost (Nancarrow 2015;

Abel 2003). Alternatively, the potential for the degradation of professional knowledge forms has

been traced to changes in the labour process and technology led by the need to cut costs

(Sawchuk 2013). The trends affecting the public sector are encapsulated in the writings of health

care human resources experts. For some, professions, with their distinct bodies of expertise and

legally defined scopes of practice, are simply barriers to an efficient health care system

(Nancarrow 2015). Nancarrow's (2015) proposed solution entails deskilling: rather than fully-

trained, skilled, professionals, the health care system needs 'micro-specialists' trained to do

specific tasks, without the big-picture context. Such workers could be trained quickly, and

would be more flexible, as workers could pick up a variety of micro-specialisms as needed.

With a team work approach, workers with a variety of micro-specialties could be brought

together to meet consumers' needs. Thus far, professions have successfully resisted such calls

for their dissolution and deskilling. Research does find that professionals are increasingly

subject to bureaucratic subordination (Reich 2012), but many productivity schemes seek to build

upon professionalism, not undermine it (Moffatt et al. 2014).

Some of these same trends are affecting professionals in the private sector, where

managers have long sought to replace skilled workers with less-skilled, when they can do so.

Nevertheless, there is still a need for highly skilled professionals in corporate workplaces.

Several scholars, however, raise concerns about professional misconduct, arguing that

professionals are being pressured to sacrifice their professional ethics and public interest

responsibilities to benefit their corporate employers, or risk job loss (Dinovitzer et al. 2014;

Parker and Rostain 2012).

These trends pose threats to professions and professional workers' knowledge.

Professionals have long been considered experts (Brint 1994). Traditionally, professional

knowledge had a dual character: it blended esoteric and theoretical knowledge with practical and

pragmatic applications (Schon 1983; Gidney 2005). As a result, professionals have long-been

trained in multiple settings, combining university or college-level education with ongoing, on-

the-job training, learning and development. The goal of professional education taken as a whole

has been to provide both depth and breadth of knowledge. Professionals not only learn how to

do specific tasks, but understand the theory behind their actions, the connections between their

work and that done by others, and the (potential) implications of their work for society.

Workforce pressures on workers to be flexible, perform a narrower range of tasks, and to meet

their clients' needs, without considering the implications or context of their actions, combine to

challenge not only professionals' working conditions, but their knowledge and judgment. Such

perspectives cast knowledge that has depth and breadth as potentially inefficient. Workforce change may be encouraging professional workers to specialize more narrowly, to follow orders, and to exercise less or at least more constricted judgment on the job.

This paper seeks to identify the workplace pressures affecting professional workers in nursing and engineering, and consider the implications of these pressures for their knowledge, skill and judgment. Engineers and nurses are ideal for such comparative case studies because: they are among the most numerous and most respected professions (Angus Reid Public Opinion 2012); they are employed in diverse organizational settings; and there has been little recent research on relations between their working conditions and knowledge use. Nurses have been historically subordinated to physicians and have more recently faced the growth of other less skilled health care workers (cf. Bucher 1988), the growth of non-standardized employment (Valiani 2012) and work intensification under health care system restructuring (White 1993; Cooke 2006). In contrast, engineers became highly professionalized with the rise of the modern private corporation with greater autonomy and status (Abbott 1991). Comparative study of these two prominent professions should offer greater understanding of the current relations between working conditions and use of knowledge and skill among professionals currently. Additionally, these relationships may vary between professionals in different class positions as well as between private enterprises, public organizations and non-profit organizations. Few scholars have focused on these differences, although Muzio and Kirkpatrick (2011) recently suggested that professionals in both public and private sector organizations are subject to similar constraints threatening their autonomy. Our comparative analysis of engineers and nurses, beginning with the oral histories reported here, will provide some systematic evidence.

In the first part of the paper we provide a brief overview of changes within the professional workplace drawing on national survey data. Then we present findings from our in-depth interviews with 23 experienced nurses and engineers about the key challenges and changes affecting their professions. We highlight the concerns they raised about the impact of workplace change on their skill and knowledge. We conclude with a consideration of the implications of these apparent trends on workers, with a focus on deskilling, career narratives, ethical practice, and the importance of class position to shaping professionals' experiences.

A Brief Statement on Methodology

Data for this paper come mainly from oral history interviews with experienced registered nurses and licensed professional engineers. Participants all had over ten years' experience working somewhere in Ontario. Professionals were asked about their own career histories, and they were asked about the key changes and challenges affecting their professions and professional work. Although there were few questions directly asking about professional knowledge and skill, our participants raised these issues often. Interviews lasted between 30 and 90 minutes, and all but one were recorded and transcribed. Interviews were conducted over the phone, in person, and over skype, depending on the location and preference of the participant. This research was approved by two university ethics review boards.

Respondents had between 15 and 45 years of work experience. They were employed in a variety of workplace settings and sectors, and held a variety of roles. Of the engineers (n=15), 7 of the participants were men, while 8 were women. Most were Canadian trained, and only 3 were members of visible minorities. Of the nurses (n=8), 6 were women, 2 were men, while

only one received initial professional training outside of Canada and none were members of a visible minority. All names used in excerpts below are pseudonyms.

In addition, quantitative data on professionals comes from a series of national surveys on the Canadian labour force (see Livingstone 2012, 2016). These surveys permit empirical analyses of the recent development of professional occupations generally and of four distinguishable class groups.[1] Some relevant findings will be mentioned here to contextualize the oral history findings. The larger project is also conducting a comparable national survey of the general employed labour force and professionals in 2016, as well as linked general surveys and more in-depth interviews with Ontario nurses and engineers with the assistance of their professional associations.[2]

Overview of Professions in the Canadian Labour Market

Prior analyses have tended to treat professional occupations as homogeneous groups and for the most part ignored employment class positions (see Johnson 1977; Livingstone 2014). We can distinguish four basic professional classes:

- *Professional employers* own either large or small enterprises and possess ultimate control over their own work and the goals of the organization, and managerial prerogative over hired workers, subject mainly to environmental contingencies.
- *Self-employed professionals* without employees have ultimate control of their own work, although they may now contract themselves to larger enterprises at times.
- *Professional managers*, without the privilege of ownership, lack the power of complete control over the collective goals or command of their organization but do possess a relatively high level of decision-making control within the organization compared with professional employees.

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[1] See Livingstone (2012, 2014) for further information on these national surveys and differences between the professional classes.

[2] Livingstone, D.W., Tracey Adams and Peter H. Sawchuk. "Changing Workplaces in a Knowledge Economy: Occupational Class Structure, Skill Use and the Place of Professions in Canada." SSHRC Insight Research Grant 435-2015-0732.

- *Professional employees'* relatively high level of specialized knowledge to perform the job, and regulatory provisions granting market privileges, make them more secure and difficult to replace than most other non-managerial employees; but they still remain vulnerable to replacement by other qualified workers and more generally as sellers of labour without control over the final product/service.

As Table 1 summarizes, the proportion of professional occupations in the employed Canadian labour force has doubled since the early 1980s.

Table 1 Incidence of Professional Occupations, Employed Canadian Labour Force, 1982-2016

1982	1998	2004	2010	2016
13.8%	21.9%	21.1%	26.3%	24.6%
242/1758	191/873	1173/5570	314/1192	741/3007

Sources: Clement and Myles (1994); Livingstone (2012); CWKE 2016 survey.

At the same time as professional occupations have grown generally, their class distribution has also shifted. As Table 2 summarizes, the proportions with ownership statuses (i.e. employers and self-employed) have remained quite small, with professional employers making up around 2 percent of professionals and self-employed professionals representing about 15 percent. But among the majority of hired professionals (i.e. managers and employees), the proportion of professional managers appears to have doubled to over 20 percent. Professional employees still make up almost two-thirds of professionals but a declining proportion.

Table 2 Distribution of Professional Classes, Canada, 1982-2016 (%)

Professional class	1982	1998	2004	2010	2016

Professional employer	2	5	5	2	2
Self-employed professional	14	15	13	14	11
Professional manager	11	10	14	21	26
Professional employee	73	68	63	63	61
N	242	191	1173	314	741

 Sources: Clement and Myles (1994); Livingstone (2012); CWKE 2016 survey.

These findings should help to clarify the professionalization and de-professionalization/proletarianization theses. They suggest that the employed labour force generally is professionalizing in terms of the increasing proportion of professional occupations. But they also suggest that increasing class polarization amongst professionals may be occurring: on one hand, the greater numbers of professional managers may be gaining relatively greater workplace power; on the other hand, the declining numbers of professional employees may be losing workplace control and facing continuing challenges to asserting wider claims to professional status. However, it should also be noted that with regard to organizing capacity, professionals generally have been found to be more likely to be members of either unions or associations than those in most other occupational groups (Raykov and Livingstone 2014).

The largest of these surveys, in 2004, permitted more detailed comparisons of engineers, nurses and several other larger professional occupations (Clark et al 2012). That survey confirmed that the vast majority of engineers (83%) were men while the vast majority of nurses (94%) were women. With regard to class position, the majority of nurses (65%) were found to be employees while only a minority of engineers (40%) were; more engineers were in managerial or ownership positions. These sex and class differences may both be related to significant differences in general working conditions, including nurses' much greater incidence of alternating shift schedules (74% vs. 13%) and lower participation in organizational decision-making (35% vs. 57%). Nurses were among the most highly organized in both unions and

associations, whereas engineers were less highly organized and very unlikely to be members of unions.

The current national survey and the linked surveys and in-depth interviews with Ontario nurses and engineers are intended to further assess the patterns found in these prior surveys as well as to pursue issues raised by the oral histories.

Challenges affecting professional knowledge in nursing and engineering.

The majority of our nursing and engineer participants said they acquired their core professional skills on the job. They learned by doing. While they acknowledged that university education was important, practical training, learning and development were seen as essential:

> I think the most learning occurring will be on the job. Like ... universities are very academic. They give you the fundamentals, I will say. … But in terms of practical, I think you learn that doing the work. (Katherine, engineer, manager).

> You know, I actually found you really don't learn a lot as an undergraduate. Especially in a highly technical area ….you just have to keep learning. (Ruth, engineer, employee)

> The skills you use on the job are acquired on the job. Real work gives you the core training you need. (Hans, engineer, manager).

> It's good to start. I always had lots more to learn, but it was good. (Nellie, Registered Nurse, employee)

> Eventually they may become an expert in what they do but that takes a while. They are not experts the first day they graduate from nursing school or university. (Charlotte, Registered Nurse, employee)

> It's my belief that university teaches you how to think about learning to do these things on the job. You can't possible learn all these things you need to know. You need to learn the tools to be able to do it once you get out there. (Cathy, Registered Nurse, employee)

Nevertheless, in both professions, our participants suggested that on-the-job training was harder to obtain now than in the past. The experiences of engineers and nurses were distinct, and will be discussed separately.

Engineers

Many of the senior engineers we spoke to participated in 'engineering-in-training'

programs after they graduated from university. Back in the 1970s and 1980s, large companies in

both the private and public sectors had two-year programs where new engineers worked in

different areas of the company under experienced engineers. After this two-year period, they

moved into a full-time job with the company, where they received further mentoring. These

programs were praised by senior engineers – this was where they learned their profession, and

acquired valuable knowledge that provided the foundation for their careers. This training period

also allowed engineering graduates to obtain the work experience required for their professional

designation, the PEng (Professional Engineer). John described his on-the-job training in the

1970s as follows:

> There was a progression of assignments during your first two to five years on the job, so
> that you could do some pretty heavy duty work at the end of the five-year period. There
> was two years of rotations, and another two to five years handholding with senior people.
> So, let's say between five and seven years of mentoring and support, and then after that
> they pretty much knew they could let you go and you would be working on your own
> with normal supervision rather than a little closer oversight by a senior engineer. (John,
> engineer, employee)

Today, companies have abandoned formal training programs.

> Not too many companies are willing to train people anymore. They want employees who are
> fully ready to go, and they don't want to invest in training. That's the new trend that we're
> noticing, and something I've seen too over the last 15 years. (Lisa, engineer, manager)

> It's basically… just-in-time delivery, so they grab a person stick him in a desk and say 'go to it'.
> (John, engineer, employee)

A related trend was a decline in mentorship. Senior engineers have no time to mentor,

and formal mentoring programs have been dissolved:

> The mentoring is pretty much gone too now. They tend to overload the supervisors with a lot of
> administrative work, and managers with meetings, and senior engineers are struggling to keep up
> with schedules because typically the schedules and the budgets now are so tight …. They don't

> want to be responsible for training people from scratch. There's very little money there to have somebody spend time training someone else. (John, engineer, employee)

Lacking formal on-the-job training, some of our respondents tried to replace it on a more ad-hoc basis:

> We tried at some point even to develop in-house training, where everybody would pitch in on a subject and develop it, and present it, and get some feedback and make changes, to keep people up-to-date on our progress… But it's challenging. There is no funding for that training (Katherine, engineer, manager).

> I tried to spend time when I had a young engineer working with me. I tried to … [my company] was a consulting company. It was all billable hours, so you didn't really have the time to teach any person anything more, because it was so many hours to get a job done. And um… it's an issue. (Ruth, engineer, employee).

Our respondents described their workplaces as high-pressure and demanding. Many – especially those in the private sector – worked long hours. This fast-paced environment not only left little time for mentorship, it pushed workers to learn quickly on their own.

> You are always going. There is no break. The work is constant. You always need to be doing professional development. You need to learn through work, and on your own to be informed. Engineering is a demanding career, and technology instead of making the work easier makes it more intense. Employers don't exactly force you to keep in touch, and to use technology to keep on top of things, but other people will do it, if you don't. You are afraid of the others, so you keep up. It makes it hard to balance your life. (Hans, engineer, manager).

> So what I see is the pace and expectations of … work. There's sometimes a real need to slow things down and take the effort to get things right. That's what I feel in engineering is a real fundamental requirement. And there is *a lot of pressure to get it done fast. And that's problematic. (*Adam, engineer, owner; emphasis added).

Thus, not only is there little time to train others, but there is little time to ensure one's own skill-set is up-to-date. Workers are left scrambling to keep up, learn quickly, and meet deadlines. Newer engineers did not receive the mentorship their predecessors did. In the words of one of the newer engineer participants: "Mentorship is a joke in the engineering world. Yeah, I have officially had mentors; they've never mentored me" (Julian, engineer, employee).

The decline of mentorship and formal training programs has been particularly hard on

new engineers. Companies want to hire experienced workers, and are less willing to invest in

someone fresh out of school, leaving fewer employment opportunities in engineering for new

graduates:

> So within 5 years of graduating, engineers … people holding an engineering degree, only 30
> per cent of them are in a job requiring an engineering degree. So, that's really kind of dismal,
> kind of sad…. [Employers] are looking for people who are highly experienced. It's not going to
> fit. Those new grads, don't have the experience, right? [There are] not enough jobs for the
> people with the skill levels that we have. (Lisa, engineer, manager).

> Right now it's kind of a jungle out there, so the engineers who are graduated, it is difficult for
> them to find the work they need to develop their skills. (Katherine, engineer, manager).

Finding it difficult to get a job in their field, many young engineers are returning to school to get

advanced degrees. Pursuing advanced education may be a strategy to acquire knowledge, since

opportunities to learn on-the-job are increasingly few and far between.

> So the challenge for the students now is where do you get that training? Do you have to go back
> to college? Do you, you know, do your Masters? Like it seems a lot more common that the kids
> stay in and do their Masters to just get that extra level. Whereas I think …um … I think there
> was more of a partnership between the students and the employers that's not there now, from my
> observation. (Sarah, engineer, owner)

Many participants argued that younger engineers were seeking out Masters and PhD degrees to

make up for the lack of on-the-job training, and to improve their chances of getting employment

in the field. Some argued that employers were partly responsible for driving this credential

inflation:

> There has been a shift in the domestic market, where companies increasingly want people with
> Masters and PhD degrees, and experience. This can lead to market difficulties for graduates.
> (Hans, engineer, manager).

Overall, then, experienced engineers argued there had been significant changes to

engineering employment and training that were hitting new engineers particularly hard.

Opportunities for on-the-job training and mentorship had decreased, and the pace of work had

intensified. Only 30% of engineering graduates could find work in the engineering field (see

also OSPE 2015). As a result, new graduates were getting more education to make up for the

lack of on-the-job training and career opportunities.

What impact do these changes have on engineers' skill acquisition? Experienced

engineers argued that the impacts were potentially profound.   Sometimes workers had no

opportunity to acquire the detailed technical and practical skills they needed to succeed:

> Some of the new engineers we hired…they're forced to learn on the job. There is no official
> training program…. I guess it's up to them to go and learn what they can on their own time. I
> think it's a problem. I really think it's a problem (Ruth, engineer, employee).

> People are basically expected to jump into the deep end of the pool, and swim. If they don't swim
> they're told to leave. If they swim, they can stay. And as a result they tend to struggle around
> water paddling instead of swimming, right? And um… the quality of the work that you get
> suffers until the person gets a deeper knowledge of the operation and work that's required, and
> how to do that particular work. (John, engineer, employee)

> If you're going to fly a jet, I'd sure like to think you know how the thing works, before you get
> behind the controls. We use some very sophisticated modelling tools for predictive analysis and
> without adequate understanding of the fundamental basic scientific and engineering principles
> behind those, I think that we are setting ourselves up for failure (Adam, engineer, owner).

Without mentorship and on-the-job training, it is harder for new engineers to acquire the

necessary 'deeper knowledge'. When learning is ad hoc and done on-the-fly, workers may miss

important background, and lose the ability to see the bigger picture:

> Older engineers understand more of the 'why' behind things….Older engineers will sometimes
> ask what is going on behind the scenes? What formula or calculation is used to arrive at that
> solution? How does that work? The new guys have no idea what is behind. They are less
> interested in the background, or how things are working (Hans, engineer, manager).

Skill acquisition is further compromised by the lack of good positions available for engineering

graduates:

> If they [young engineers] do get a job they will be relegated to clerical positions where they
> won't get an opportunity to actually practice any real engineering and build up their skills (Julian,
> engineer, employee)

Thus, many of our senior engineer interviewees felt younger engineers were unable to acquire the deep skills they needed. Several raised concerned about the implications of these changes: "We may suffer a quality loss as we try to do things faster, cheaper, and understand the entire process less" (Hans, engineer, manager).

The lack of opportunities to build knowledge through on-the-job training and experience could damage engineers' career prospects. This said, some senior engineers believed that if engineering graduates were able to find work initially, their skill deficits might not limit their career opportunities. With their advanced degrees and academic training, they could advance quickly:

> Some of the young engineers we were hiring just before I left… I think they were pushed up a little bit more quickly. Partly because they're trying to replace all the retiring baby boomers. Um .. they didn't… I don't think they had the training, I don't think they had the skills and knowledge. So, perhaps they are then trying to put the young people in the management jobs and bring back the old ones with the skills and the knowledge. It's awful what they do. They bring them back as contractors (Ruth, engineer, employee/contractor).

In a context where there is little mentoring or on-the-job training, new engineers do not have time to learn from earlier cohorts, as they may have in the past. Ruth argues that in her branch of engineering, a lot of the core engineering work was still being done by engineers trained in-depth under the old system. If newer engineers lacked core technical skills, however, this did not appear to limit their career advancement. Many other participants agreed that opportunities in engineering for those who got a foot in the door, were quite good. The problem seemed to be in gaining that first job and experience.

Overall, these accounts suggest that workplace change has made it more difficult for new engineers to acquire the core technical skills, and in-depth knowledge, they would previously have obtained through on-the-job training. This said, experienced engineers also argue that

required skills have shifted. New graduates may need skills their predecessors did not, especially

soft skills:

> But it's the soft skills that they don't really teach you in engineering education, because that's not really core, um, but I think it's really key to success. Right? So, great you can design a great solution, and um you can fix the problem, but if you don't know how to present it? And get approval to proceed, you're ... it's not good, right? (Lisa, engineer, manager).
>
> [New engineers] wind up getting jobs that require different skills. Uh. I am having to stretch my skills in interpersonal relations and communications and database work which ... was not part of ... of my core training.   (Julian, engineer, employee).

Some new graduates may actually have an advantage over their predecessors, at least in certain

areas:

> I think that the kids are coming in with wider experience. I think they're coming in with um, great computer skills, a lot of confidence. They're great in presentations, you know, good in the meetings. Really good in selling themselves… (Ruth, engineer, employee).

Possession of these soft skills may facilitate the career advancement of newer engineers into

management.

To summarize, engineers argue that workplace changes are having a profound impact on

engineering knowledge. Traditionally engineers acquired core skills from the workplace, and

on-the-job training. Companies' unwillingness to train new workers, combined with work

intensification, has led to a decline in on-the-job skill acquisition. Workers are scrambling to

acquire advanced degrees, and learn on their own time. Their ability to develop deep knowledge,

and some core skills, appears to be compromised. At the same time, engineering practice itself is

changing, and workers need new skills. If new workers are at a disadvantage in obtaining core

technical skills, experienced engineers feel they may be advantaged in acquiring inter-personal

and presentation skills. Professional knowledge appears to be changing. The implications of

these changes will be discussed in the conclusion. First, though, we consider the working

conditions and deep knowledge skill acquisition among nurses.

Nursing

Nurses generally noted that initial education was important, but that learning in the workplace (both organized and informal) was just as invaluable. In this context, just like the engineers, nurses too registered both the importance and the recent decline of organized mentoring:

> I know I got it and it really made a difference in my nursing career. I'm just not seeing a lot of nurses wanting to mentor or even be a preceptor [i.e. the formal assignment of an experienced nurse to mentor a new nurse] anymore. It used to be quite common. (Constance, Registered Nurse, employee)

> Number one, there seems to be less senior nurses that have backhand kind of mentor or preceptor to students in an informal type of way. So they are learning bad habits from maybe not the best people. (Charles, Registered Nurse, employee)

> These people are new, they need to be supported and they need to be coached because they are starting like you were twenty or fifteen years ago and they need to be supported. Because if not they quit, they leave nursing and that's bad for the profession. (Peter, Registered Nurse, employee)

Especially in lieu of organized mentoring, ad hoc informal learning on-the-job remains important for nurses as for engineers.

> Primarily learnt it in I guess you would say in undergraduate school, but honed those skills and knowledge in the workplace. I think really developed the skills and knowledge actually in the workplace just like doing things as practice changes, different clinical situations and things like that, you learn different things as far as skills and knowledge about a disease or a process or whatever that may be. So I think most skills I've been learning have been done in the job, with coworkers, either at the bedside or my current role, which has periods of bedside but it's more like a leadership type of role. So it's definitely been in the workplace. (Charles, Registered Nurse, employee)

For nurses, this opportunity to learn from colleagues on-the-job was complemented by organized training and continuing education in various forms, and it was deepened further by the process of changing roles/jobs regularly. For example:

> While I always kept myself updated with new in-service programs, [and] I went back to school as well, it was the practice on all floors on the hospitals, and every time I went to a new unit, a new

> department, a new area of practice, I was updating myself with the co-workers over there and then the in-services. That's how I kept learning. (Peter, Registered Nurse, employee)

> I really like this idea of having a lot of opportunities that nurses can change jobs because you really build strong expertise. (Valerie, Registered Nurse, employee)

Still, according to some, the opportunity to accumulate professional knowledge by shifting roles/jobs is a strategy that may be less open today than in the past, which in turn has augmented advanced credential obtainment.

> I do believe it could be difficult moving forward in the future. There's starting to be a lot of pressure for Master's level entry. In fact I'm not sure I'd get my job now. Whereas I got it based on the experience of a number of projects and leadership roles I'd already played here. (Cathy, Registered Nurse, employee)

Learning informally on-the-job (from coworkers and in the course of one's own individual practice) of course has similarities to workplace mentoring. An important difference, however, is that mentoring – as a planned process with a formally selected mentor – is oriented in many ways by a form of curricular design and pedagogy. Ad hoc learning on-the-job, on the other hand, is much less so. Indeed it is in the latter dynamics of professional development (ad hoc learning) where the dilemmas of professional skill, knowledge and judgment are likely to be made more contingent upon organizational/bureaucratic concerns and the labour process as opposed to the established tenets of professional practice, knowledge and ethics as such.

It is in this context we can consider the specifics of ad hoc on-the-job professional learning and development in a distinctive way. In the case of nursing, austerity–the need to find new efficiencies and reorganization of the core models of health care work—does seem to represent a significant challenge to nursing professional knowledge forms.

> I definitely see it as moving away from the bedside so to speak, one-to-one direct client service care and more of a case management model I think. It is what I'm finding, which allows us to use little more of our scope of practice I think, because then we are managing multiple issues at the

same time. But then sometimes we also lose the getting-to-know-people one-on-one kind of thing, so it is a trade-off but I definitely see us moving more toward to a case management approach for sure. And a Team model. (Lisa, Registered Nurse, employee)

Now everything has been so split up, anybody has no communication and organization systems, so the continuity of care is getting lost. And that of course results in people falling through the cracks. And at the end of the day, it's really tricky to know who is doing what, where and when. (Valerie, Registered Nurse, employee)

When it comes to practice change or product change that you are participating in or that you are implementing, there is definitely a lot more need to show evidence and cost analysis for things. An RN has to think about this too. So we need to make sure we are doing things more financially responsible…How can we do things more effectively, more efficiently with less basically? So that's the biggest thing, it's that money is not there anymore and learning how to do things with that. (Charles, Registered Nurse, employee)

Thus, the data suggest that workplace changes are having a significant impact on nursing professional knowledge, although in distinctive ways. These changes are not so much associated with initial professional education and certification, but rather the dynamics of ad hoc on-the-job learning that stems from new technical divisions of labour (i.e. new tasks), new social divisions of labour (i.e. new occupational sub-groups) and related aspects of the health care labour process more broadly. Class position within nursing as a whole inclusive of effects brought on by new occupational sub-groups in particular may be undergoing change. For example, from the standpoint of Registered Nursing, team-based and case-based models have introduced new, less-skilled health care occupations to the labour process, and with these changes RN's must perform new tasks, and acquire new skills.

So the team has changed in that there's less higher-skill staff. And as a result my role has changed from providing direct care [for] the majority of my time to team management: Leading a team, making sure that all the work gets done. And in whatever time's left, I do my RN care. So it's not that I don't enjoy the leadership aspect of my role, I very much do so. But there's a very different skill set required for a nurse, an RN, from years ago. I really like my job as an RN because I have great expertise in making very fast decisions when I need to. [But] I would say that there is a de-skilling happening. There is less and less of us. And they are being replaced by lower skill groups. (Valerie, Registered Nurse, employee)

Significantly, an orientation to cost-savings and doing things "more efficiently with less basically" is likely more profound than it may seem at first blush, if it is the case that such concerns are in fact shaping the nature of professional nursing knowledge and judgment-making on-the-job--the location these interviewees universally claim is the most important of learning and development.

Conclusions and Implications

Evidence from both the quantitative and qualitative portions of our research suggest that professional careers are undergoing change, and further that professionals' experiences can vary significantly across sector and class position. Although the changes affecting nurses and engineers are not identical, there is evidence in both professions that change has implications for deep skill knowledge and judgment acquisition, even as some of these changes actually continue to encourage intensive learning of a type. It appears that new knowledge and skills are developed, even as others are marginalized or lost.

In broad terms, we find it both significant and problematic that our engineer and nurse participants continue to champion the necessity of on-the-job learning. It is significant because interviewees claim it as essential for establishing the deep forms of skill, knowledge and judgment which they say actually define their professions. With the decline of organized mentorship, ad hoc and informal on-the-job learning is left to play an increasingly important role in professional development. This is problematic in some ways since ad hoc on-the-job learning exposes professional skill, knowledge and judgment to the often contradictory needs of the various labour processes, organizations and political economic pressures. Paying closer attention to each of these significant and problematic aspects of on-the-job learning, we find the potential

for better understanding shifts in professional knowledge forms that likely speak in a more subtle tone to the processes of deprofessionalization and deskilling.

These observed skills changes, and shifts in knowledge development have numerous implications for professional careers. And so, stemming from our initial findings, in our research we are particularly interested in developing the following themes.

Deskilling and skill-upgrading

Several years ago, scholars critiqued the deprofessionalization and proletarianization theses, arguing that professions had successfully protected their core skills, and professionals combatted deskilling by developing new professional knowledge (Freidson 1983; 2001; Coburn 1994; Reich 2012). Our findings too suggest that as some traditional skills are undermined, new skills are gaining prominence. However, we argue, there is evidence that the new skills are fundamentally different in character. Opportunities for acquiring deep knowledge and core technical skills are dwindling. Workers' are acquiring skills on the fly, and hence their knowledge may increasingly be narrow and pragmatic. New skills include those classified as soft skills -- working with others, and leading teams. At the same time, the very nature of professional skill, knowledge and judgment may be in the process of transformation as they become more contingent on various organizational, sectoral, and political economic pressures. More research is needed to determine if deep skill knowledge is being lost, replaced by more superficial, narrow, or specialist knowledge, and/or soft skills.

Occupational and career narratives

Our research has begun to take up the question of occupational narratives as a means by which professions and individual professionals actively engage in the construction of their working lives. Following Sennett (1998), our preliminary findings suggest changes in occupational narratives that, in turn, may implicate the way in which professionals learn, develop and construct their distinctive forms of knowledge. Organizational as well as labour market, sectoral and broader (even globalized) economic contingencies are being entered into these narratives in distinctive ways, it seems, in part based on the emerging prominence of on-the-job experiences and learning. Are the occupational narratives we have begun to explore made less legible (Sennett 1998) in some ways, and are they being made more legible in others? Are the shifts in the forms and dynamics of learning, inclusive of creeping credentialization, indicators of alternative occupational narratives?

Ethical issues:

The literature on the changing nature of professions has raised questions about professional misconduct and professional ethics (Dinovitzer et al. 2014). Our engineering participants do as well. Some fear that employer and client concerns for the economic bottom-line, and for getting work done as quickly as possible – and not necessarily as effectively as possible – raises ethical concerns. Licensed professional engineers, like other professionals, are charged with upholding the public interest. They are required to maintain certain standards in their work. Participants suggest that employers are often hiring non-engineers to do engineering work, and conversely, hiring engineers to do non-engineering work. In both contexts, engineers may be pressured to be less thorough than they may want to be, and this raises questions surrounding not only skill, but ethics as well. There may be growing pressures on engineers to compromise their professional

ethics, in favour of the economic bottom line. Likewise, the question of professional ethics lurks within the descriptions of nurses' working lives as well. Patients fall through the cracks amid the confusions of new work models as well as the addition of new occupations to the health care labour process. Nurses seem to actively take on a consideration of what is cost-effective in the course of professional judgment-making even while they wring their hands with concern. Thus, workplace trends, and trends in skill upgrading and deskilling, have implications for professional ethics that should be explored in more detail.

Class issues:

Are different classes of professional skills affected differently? Is it the case, for instance, that engineering managers and employers are able to develop and enhance their skills, while engineering employees suffer skill loss? The limited prior survey evidence suggests that professional employees may be relatively disadvantaged in recognition of their specialized knowledge in some instances (Livingstone 2014). More generally, professional employees have previously been found to have relatively low levels of underemployment compared to other hired employees (Livingstone 2009). But, is underemployment increasing with the growing numbers and supply of qualified professionals generally and engineers and nurses in particular?

In terms of career development profiles, changing class composition as well as upward mobility into managerial roles and ownership class positions with attendant increases in workplace control should be taken into account in further comparative studies of professionals. Is the growing proportion of managers among professionals limiting interest in continuing development across the areas of defined by the established tenets of professional skill and knowledge, for example?

Moreover, with regard to professional ethics, the differential power in different class positions entails different constraints on professional choices. Do professional owners, managers and employees perceive the ethical conduct of owners and workers or the working conditions in their organizations differently? Are professionals in some class positions more concerned with maintaining professional standards than are others, in these times of rapidly changing working conditions?

All of these class issues have received little attention to date in studies of professionals and all warrant continuing systematic comparative empirical analysis, such as we intend in the current project.

Concluding thoughts:

Our research raises concerns about the prospects for professional employees. Their opportunities for learning and development may be changing as employers steer away from organized on-the-job training and mentoring, and at times endeavour to replace professional workers with lower-cost, less-skilled alternatives. These trends combine with work intensification, and in some cases the introduction of new work models, to challenge professional autonomy, and undermine opportunities for deep knowledge and skill acquisition. The implications of these changes are potentially far-reaching.

We have begun to argue that certain patterns of deskilling and skill-upgrading are involved, but that understanding these requires careful attention to experiences on-the-job that appear to be increasingly contingent on various organizational, sectoral and political economic pressures. We have also identified the relevance of career narratives. In this regard, our premise is that an understanding of the ongoing construction of these narratives forms an essential part of

the explanation of the trajectories upon which a profession and the professionals that constitute it develop. Here again we find evidence of an array of pressures shaping these narratives in new ways. For those we spoke with, each of these sets of changes raises ethical concerns that warrant further analysis. With regard to class analysis, all we can say with any confidence at this point is that the proportion of the employed Canadian labour force in professional classes has been growing, and that the relative proportion of professional managers has been increasing while the proportion of professional employees has been shrinking. While our oral history interviewing has provoked a number of preliminary insights, in point of fact it does not contain a sufficient number or range of engineers and nurses in different professional class positions to draw any further conclusions. Analysis of the 2016 national survey, which has just been completed, and the soon to be conducted large survey and in-depth follow-up interviews with Ontario nurses and engineers should permit more systematic analysis of the class differences on the issues identified in this paper. Indeed, we argue, it is only by combining the study of professions and professional labour/learning processes, with a study of broader shifts in the labour market and the Canadian class structure, that we can expose the underlying trends, and understand that change to professional work may reflect broader societal changes affecting work and workers more generally.

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