

The Changing Nature of Professional Work and Professional Knowledge: A Case study of Canadian Nurses and Engineers

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Professionals' ways of working appear to be changing. There is an extensive body of sociological literature documenting changes to professional regulation, including requirements for continuing education and recertification, and changing scopes of practice (Adams 2016; Saks 2015; Chamberlain 2013). The literature on professions and organizations documents how the structure of professional workplaces is transforming (Brock 2006; Ackroyd 1996; Cooper et al., 1996; Noordegraaf 2007

in complex situations (Champy 2016). Their work requires the exercise of judgement, and the ability to think flexibly and quickly to apply scientific knowledge in often unique circumstances (Champy 2016; Freidson 1986). In this manner, professional expertise blends esoteric, theoretical knowledge, with practical and pragmatic applications (Schon 1983; Gidney 2005). To understand professional knowledge, therefore, we need to consider both practical and esoteric dimensions.

Because professional knowledge and expertise are complex, professional education has traditionally been broad, taking place in multiple settings. For at least a century, professional training has combined university or college-level education with ongoing, on-the-job training, learning and development (Gidney 2005). Not only do most professional schools provide opportunities for practical hands-on learning, but many professions require a period of field experience before candidates can obtain their final registration or license to practice independently. Thus, professionals receive only some of their knowledge and skills in formal educational settings. Much of what they know they learn by doing – on the job.

It is in this context that workplace change has potentially significant implications for professional skills and learning. In today's global capitalist market place, knowledge is increasingly commodified (Grace 2014: 23). As a result “what were complex, interpersonal processes of teaching, learning, and research” are being transformed into a “set of standardized measurable products” (Ibid). In Canada and the United States generally, firms once willing to train workers, to invest in them and provide them with learning opportunities, now prefer to hire workers who already have measurable skills in place (Hall 2014). Opportunities for professionals-in-training, and other workers, to acquire skills on the job may be dwindling (Ibid).

As the pace of work intensifies with rationalization, workers may have less time to invest in deep knowledge acquisition. Or workers may acquire the skills they need to get the job done, but not fully understand the background or implications of their decisions. The ability of professionals, in this context, to fulfill traditional fiduciary roles may be compromised (Grace

with rationalization, this “does not represent a reduction in the control of professional work by the *profession* itself” (Freidson 1994: 139). Professionals are often still in a position to direct the work of others, and professionals are also in a position to generate new professional knowledge through research (Ibid). Taken together, this research suggests that organizational change may lead to routinization, but this in and of itself, need not undermine professional knowledge, control, or authority. Moreover, routinization and deskilling, may be accompanied by the emergence of new knowledge, and skill upgrading (see also Sawchuk 2013).

Today, there is considerable evidence of workplace change. Technological change, work intensification, and professional reaccreditation and recertification requirements encourage professionals to upgrade their skills continuously. At the same time, however, workplace change may be subjecting professionals to greater organizational control, reducing their autonomy, and potentially routinizing professionals’ skills. To understand this duality better, in this paper we explore the impact of workplace change on the knowledge and skills of engineers and nurses, drawing on their own accounts.

Methodology

Our data come from both in-depth interviews and practitioner surveys. First, we conducted “oral history” interviews with 23 experienced registered nurses and professional engineers. All participants had over ten years’ experience working in Ontario, Canada. Professionals were asked about both their own career histories, and the key changes and

the impact of workplace change on professionals' skills. Our overarching research question is this: *What is the impact of workplace change on professionals' knowledge and skills?* To answer this question we first consider the implications of workplace change for on-the-job training and mentorship. Next we explore professionals' learning and skill acquisition strategies. Last, we explore how workplace change is shaping the skills professional engineers and nurses say they exercise on the job.

On-the-job training, and workplace change

Surveys asked nurses and engineers what source of learning they valued most: formal learning in educational institutions or on-the-job? As Table 1 shows, almost half of all engineering respondents said they valued on-the-job learning most, while most of the rest valued a combination of on-the-job learning and formal education. (Nurses?)

Table 1. What source of learning do you value most as an engineer / nurse?

Engineers
% (N)

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).

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

You cannot just graduate from university and start practising engineering. It's a learned profession. There is a graduation in your understanding and your experience level. You have to layer it. You have to be mentored. You have to have knowledge transfer from experienced engineers.... Getting those opportunities to have [on-the-job] training is essential for the profession. (Julie, engineer)

Nurses also emphasized practical learning in combination with formal education:

Eventually they may become an expert in what they do but that takes a while. They are

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)

Julie's experience in the 1980s was similar:

I had a phenomenal engineering-in-training program It was a two-year program, I would almost call it a boot camp, almost like a military overtone. I don't mean that in a necessarily bad way, but it was character building. What they did is every six months they moved us around to various core components of the organization.... We might have got a bit of choice as to which ones we wanted to rotate through For a young engineer, this was excellent training about the real world and how engineering gets done.

Engineers report, however, that now most of these engineer-in-training programs are gone.

Opportunities for new engineers to 'apprentice'

some of the more participants suggest that there are fewer professionals willing to mentor, but there is evidence from both nurses and engineers that the problem may be more a matter of time than desire. In the survey, we asked nurses and engineers about workload change. As Table 2 shows, both groups of professionals have experienced workload increases in the last 5 years, but the trend is particularly marked amongst nurses.

Table 2 Has the workload in your job changed over the past 5 years?

	Engineers % (N)	Nurses % (N)
Increased Greatly	24.6 (130)	58.0
	41.0 (217)	

experienced an increased workload, it is still the case that roughly two-thirds say the demands on them have risen over time.

In interviews,

If fewer professional engineers and registered nurses have time to acquire skills through mentorship and on-the-job training, where do they –

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)

Our survey data provide additional context and support. We asked nurses and engineers about their learning activity. On the whole, not surprisingly, practitioners were already highly educated. Amongst engineer respondents, 66% had completed a university bachelor's or professional degree, and an additional 33% held a graduate degree. Nursing respondents reported ... Despite this high level of training, both types of professionals were heavily engaged in continuing education. Over half of engineers (54%) and xxx of nurses reported taking formal education or training in their field in the past year. Members of each profession were also regularly involved in informal learning to develop their skills, as Table 3 shows.



Not at all	4.5 (31)	0.2
Very little	8.1 (56)	1.9
A moderate amount	28.6 (198)	10.9
Quite a lot	35.6 (247)	30.7
Fully	23.2 (161)	56.3

The news is slightly more positive for engineers in Table 6, which shows that 62% report that, in terms of their education, they are adequately qualified for their jobs. Still roughly 30% report being over-qualified. **NURSES.**

Table 6. In terms of your schooling, do you feel you are qualified for your current job?

	Engineers % (N)	Nurses % (N)
Very over-qualified	7.7 (44)	
Somewhat over-qualified	22.9 (131)	
Adequately qualified	62.0 (355)	
Somewhat under-		

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)

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).

John and Hans suggest that while workers may be acquiring new skills, they lack “deeper knowledge” that earlier professional engineers had the opportunity to acquire.

To touch on this dimension of skill complexity and depth, we asked our survey respondents whether they considered the body of knowledge they brought to their jobs to be complex.

Table 7 Do you consider the body of knowledge you bring to your job to be complex?

	Engineers % (N)	Nurses % (N)
Very complex	26.8 (149)	

Nurses. Moreover, there is evidence that many professional engineers possess decision-making authority: 48% of engineers believe they meaningfully participate in decision-making. In contrast only about **xx%** of nurses claim the same (full results not shown here). It may be the case that professionals have less opportunity to acquire ‘deep knowledge’ and exercise complex skills than they did in the past; certainly many professional engineers and nurses report they lack the ability to make decisions, and use their professional knowledge fully in their current jobs.

Nonetheless, the survey does not provide evidence of skill decline. Quite the contrary. We asked respondents if the skill required to do their job had become greater or lesser over the past five years.

Table 8. In the past 5 years, has the skill required to do your job become greater or lesser?

	Engineers % (N)	Nurses % (N)
Much greater	12.0 (65)	32.3
Somewhat greater	50.7 (274)	46.2
Stayed about the same	33.5 (181)	17.9
Somewhat less		

the majority of practising professionals in engineering and nursing undertake regular skill upgrading. How do we reconcile these findings? The qualitative interview data suggest that – especially amongst nurses – skill demands are changing.

We moved from hundred per cent patient care to a lot of work around administration, regulation, documentation as opposed to a lot of that hands-on care. So that is the latest change that I've seen happen. Nurses are pulled away to do a lot of other work and as a result, they are not spending enough time with the patients and their families. (S01)

It's become definitely more of people management than illness management. Or you are not so much dealing with, I mean when you are dealing with patients who are really sick you are obviously dealing with that, but there is more what they call "red tape" now. You can't just now give care, you have to sometimes jump through a lot of hoops just to be able to give the care that the patient needs. So I think there is a lot of frustration. (S06)

These registered nurses report less time spent at the bed-side exercisJETred

way they should be done.[...] And, it's changed with technology, so there's way more technology which people have to be responsible for knowing. And they have to be really tech-savvy, and if you're not, you're kind of thrown onto the curb, kind of lost in your work. (S03)

The breadth of nurses' roles have clearly expanded, even though the time they devote to traditional or core nursing tasks may have declined.

Although these themes are less strong in our interviews with engineers, there is still evidence of new skills being gained. Our respondents talk about the need for more soft skills and managerial skills. Consider these comments from Julian:

[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.

Similarly, Lisa argues that soft skills are expanding:

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 ... it's not good, right?

There is evidence that engineers are increasingly being employed to do non-engineering work in Ontario (OSPE 2015), and this trend

be undermined with workplace change. Future research should continue to investigate workplace change and its impact on professional skills and knowledge, as well as professionals' efforts to resist these changes, which would appear to strike at the very heart of professions and their work. Organizational encroachments into professional knowledge and skills acquisition

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