P A R T N E R S H I P
The Canadian Journal of Library and Information Practice and Research
Revue canadienne de la pratique et de la recherche en bibliothéconomie et sciences de l'information

vol. 12, no. 1 (2017)
DOI: http://dx.doi.org/10.21083/partnership.v12i1.3962

Coding and Professional Development—Part 2: A Case Study of Grassroots Change

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This article is Part 2 of a two-part article. Please see Part 1.

Abstract

This article looks at concrete examples of grassroots organizations and initiatives that foster and support professional development in coding for library workers.

Keywords

critical theory; information technology; software development; class; gender

Politics and Software Development

It's impossible to discuss a field as broad and longstanding as librarianship, with its issues of gender, power, and racial inequalities, without talking about politics. If we add in the question of technology—one of the most political issues of the 21st century—it becomes clear that the question of politics in library technology must be addressed. In her 2015 survey of coding in libraries, Yelton (2015) devotes an entire chapter to the "political and social dimensions of library code," arguing that "code can challenge hierarchies and change workflows, leading to resistance." Political capital must be expended "trying to cultivate buy-in, educate… colleagues about technology, or work against siloed organizational structures [to] produce inherently cross-departmental work" (p. 22).

One of the main political obstacles in this respect is the suspicion of library administrators and staff that coding is not core library work, possibly not even library work at all. Or that it should be enclosed within explicitly IT units, drawing a line

between (masculine) software development practices and (feminine) library work. Many of Yelton's respondents state that their positions were never understood to have a programming component and that even when programming made them more efficient and effective in their jobs, professional development support was often not forthcoming.

In addition to a lack of official support, libraries often lack unofficial means whereby coders can share information and code, or even participate in informal communities of practice within their organizations or the wider field of librarianship.

Many of these obstacles are bound up with questions of security, discipline, and control. Staff members often don't have administrative rights over their workstations out of concern for the protection of organizational property, which means they can't install the tools to do programming work on their computers. Even seemingly insignificant barriers, such as having to request that an IT department installs a piece of software, become an obstacle to skill development when coupled with imposter syndrome and the professional dynamics of our organizations.

There is a struggle within librarianship between those who promote the adoption of new technology "from above" and those who resist what they see as an imposition of new technologies. New technologies, especially automation, are a tool in the capitalist strategy of replacing human labour with machinery, and library workers rightly feel uneasy at the prospect of new technologies of an efficiency and effectiveness sufficient to put them out of work. We have seen this mostly in the decline in cataloguing departments (Calhoun, 2013, p. 155), but there's no reason why this could not happen in any other area of library work.

This struggle is represented by the perennial conflicts between public service units and IT units (which are seen as privileged in staff and financial support). A movement "from below", a movement willing to expend political capital in breaking down silos and challenging the dominant model of technology adoption (i.e. the procurement of proprietary software) might have a chance of transcending this struggle to offer us a sustainable and equitable way forward.

The Contradiction of Automation

One of the challenges in the promotion of technological solutions in libraries is the question of what to automate. On the surface, this is a purely technical question with (one might assume) a straightforward technical answer. Indeed, as Limoncelli (2015) observes, there are two principles that can be applied to this problem: the "Leftover Principle" ("automate the easy parts and what is left over is done by humans") and the "Compensatory Principle" ("people and machines should each do what they are good at and not attempt what they don't do well"). These principles create a set of binary oppositions: easy/hard, machine-suited/human-suited, etc.

> Machines don't get bored, so they are better at repetitive tasks. They don't sleep, so they are better at tasks that must be done at all hours of the night. They are better at handling many operations at once, and at operations that require

> smooth or precise motion. They are better at literal reproduction, access restriction, and quantitative assessment.
>
> People are better at improvisation and being flexible, exercising judgment, and coping with variations in written material, perceiving feelings. (para. 13–14)

This view of work sets up a notion that there is a worker—human or machine—and there is work to be done, but it ignores the larger context of work: that human labour is an engagement between, and a mutual transformation of, the world and the worker. In this sense, automation could be seen as a means by which labour is taken away from the worker and handed to the machine (which does not engage with the worker but simply performs tasks). The question raised, then, is: who decides what work is taken from workers and handed to machines (i.e. who decides what work "must be done at all hours of the night"?), and what are the consequences of this handover. Framed in this way, with decision-making power and agency at its heart, the question is inherently a political one.

Labour theorists have written much on the development of "cyber-capitalism", the replacement of human labour—both material and immaterial—by machine in the process of globalization, financialization, and proletarianization that has spread worldwide since the fall of the Soviet Union in 1991. Dyer-Witheford (2015) writes that

> by lowering the costs of its own elementary component, the microchip, the computer industry enabled a cheapening of machinery that, in principle, would permit capital's [replacement of human labour by machine] to rise without activating a fall in the rate of profit. It allowed the development of a new set of machinery to counteract the fixed costs of industrial investment: machines to make other machines, machines to speed up yet more machines, machines to capture cheap labour, machines to utterly replace labour – a meta-machinery turning the calcifying cathedral into a scuttling hive of artificial intelligences. (p. 36)

In addition, while Limoncelli's list of things "people are better at" might be comforting, machinery is already being used to phase out the employment of humans in what we think of as quintessentially human activities, such as the production of art or music, the playing of complex games, or the making of emotional connection between people (Justice, 2015). From this perspective, the contested narratives around automation and library technology become more clearly defined. Technology implementation, workflow automation, and the decisions around who is expected, allowed, or able to acquire technology skills are complex political issues within a much broader socio-economic dynamic.

Capital, Gender, and Labour

One of the frameworks we might productively employ in studying these dynamics and contradictions is Marxism, precisely because it is both a political theory and a theory of technology and labour. For Marx, capitalism is the mode of production in which workers are compelled to sell their labour-power as a commodity. Capitalist profits derive from

the fact that workers can be (and are) underpaid for their labour. It is human labour that creates value, so if a worker puts in eight hours of labour but is only paid for the value she created in five hours, then the capitalist receives three hours of labour/value for free. The need to maximize and constantly expand the value added by unpaid labour is the heart of capitalist exploitation and the expansion of capitalist economies (Marx, 1976, pp. 283-306).

Replacing human labour with machines is one strategy for increasing the amount of unremunerated value as outlined above by Limoncelli ("machines don't get bored…. don't sleep…"). From a capitalist perspective, the replacement of human by machine labour allows fewer workers to be employed, thus lowering the wage bill and increasing competition among workers for jobs. But, Marx argued, machinery cannot be exploited; the capitalist cannot extract more value from a machine than he paid for it (Marx, 1976, pp. 307-319).

On the other hand, Marx also recognized that the automation of menial, repetitive tasks ("the boring stuff") is a condition for the emancipation of labour; with it, workers will be free to employ their creative activity on interesting, meaningful work (Veltman, 2016, pp. 62–65). This is at the heart of the contradiction in the library world between a desire for more automation "from below", which is resisted by library administration, and a desire for more automation "from above", which is resisted by library workers. As Alan Harnum (2016) noted in response to Limoncelli's article, the idea that "'human workers [are] terrible & should be replaced w/ (*sic*) software' is very different from 'human workers [are] useful & should be assisted by software'."

The tendency in libraries is the same as in any capitalist enterprise: replace labour power through automation so that the university or municipality can "do more with less" (a common refrain in libraries). In both public and academic libraries in Canada, the profit motive may not be openly admitted, but the same logic of increased productivity and efficiency holds sway. This leads to a reduction in full-time staff and an increase in part-time contract, student, and other forms of precarious labour (Groover, 2014; Mayer, 2016) and increased automation.

The installation of self-checkout machines in the guise of patron convenience and efficiency is a classic example of replacing human labour power by machinery, while many library workers don't have administrator rights on their workstations. Thus libraries are all in favour of new technologies when they satisfy the requirements of increased automation and a lower wage bill, but not when they support increased worker agency and self-directed support of work by software.

This logic is at the heart of all of librarianship's labour problems, from a lack of diversity, through the gender wage gap, the exploitation of student and other precarious labour, to the prevalence of men in higher administrative and technology positions while the field is otherwise predominantly female. One thing these phenomena all have in common is a stratification of the workforce, with a larger number of lower paid workers at the bottom and a small number of higher paid workers at the top. The top of the pyramid

shades ambiguously into the realm of management, exemplified by the mix of in-scope and out-of-scope union recognition at the upper levels.

Not only does this stratification and the associated power dynamic lead to competition among workers and oppression of workers by workers, it also allows capital to have a finely graduated mechanism for extracting more value for unpaid labour. As Posner (2017) and many others have pointed out, one of the largest factors in this pyramid of exploitation is the undervaluing of perceived feminine or feminized labour.

Over the last few years, some Canadian universities (e.g. McMaster and Waterloo) have done internal studies to determine the extent of the gender pay gap, finding an average gap of around $3,000 per person (CBC News, 2015; Loriggio, 2016), implementing lump sum payments and pay raises to help close it. There are some standard "justifications" raised against the idea of a gender-based pay gap, none of which are worth trying to rebut, but it is worthwhile to look into how Marxism might explain the presence of the gap.

As we have seen, Marx's theory of capitalist profit argues that only human labour can be exploited, or produce more value than it costs (in wages and social reproduction costs). Thus any social mechanism which lowers pay for some workers (e.g. women) can be economically justified, since it increases the surplus value produced by women. These social mechanisms are often presented as open misogyny, but also operate indirectly (for example, in the ways women are subtly disadvantaged during salary negotiations).

Lenin observed the bribery of the upper levels of the working class with higher wages in return for their support of status quo (though the concept predates him [Hobsbawm, 2012]). The reason for increased exploitation of women (and other marginalized groups such as racial or ethnic minorities and migrants) with respect to men is that it enables male workers to be bought off by being in a "better" situation. Historically, working class men come to identify with capitalists, believing themselves to be unexploited (which explains the rise of Men's Rights Movements, when their situation declines from what they have historically been accustomed to). One thing to bear in mind (especially among male workers who are happy with their lot) is that, under capitalism, *all* workers are exploited, as all workers are forced to produce surplus value. Here, women are *more* exploited simply because they are women.

In terms of professional development, the acquisition of skills is usually seen by workers as a way to improve their work experience, or a way to gain higher position or salary, or both. The contradictions inherent in the capitalist mode of production play out in this process, as higher skills command higher wages, but higher wages provoke a wave of automation, often driven precisely by the work done to gain technology skills in the first place. Attempts for increased agency or better positions within a field are undermined not only by automation but also by social tactics such as the "feminization" of particular subfields (like front-end software development) in order to pay those subfields less.

Given that libraries are bureaucratic organizations of the capitalist state, the desire for increased agency and better pay can be understood as a desire on the part of workers for increased self-determination in the face of increasingly centralized control, as well as remuneration for feminized, immaterial, and affective labour. It is precisely this desire on the part of rank-and-file library workers that distinguishes the need for increased professional development support of programming skills from the imposition of automation from the top down. And it is only through grassroots organization and self-activity that the contradictions inherent in the library's attitude towards technology and labour can be challenged.

Practical Workshops at Code4Lib Edmonton

In 2013, a group of library technology workers from various institutions formed an Edmonton chapter of Code4Lib ("coding for libraries"), based on the successful models of Code4Lib North in Ontario and Code4LibBC. Code4LibYEG was an attempt to foster cross-institutional, non-hierarchical, semi-formal collaboration among workers in academic, public, and special libraries. Similar to Ontario and BC, Alberta (and Edmonton in particular) has many post-secondary institutions and large public library systems, all of which are active in various ways in newer library technology initiatives. Edmonton Public Library, for example, includes robotics as part of its makerspace programming, and University of Alberta and MacEwan University are both active in the Hydra and Islandora institutional repository communities.

Code4LibYEG has positioned itself as a group where anyone with an interest in library technology is welcome, can share information and knowledge, and can collaborate. Professional development quickly became the main focus of the group, beginning with an evening of lightning talks in November 2013. The lightning talks focused on technologies newer to the library field such as OpenRefine, Raspberry PIs, and using third-party application program interfaces (APIs). The talks also included terminologies and tools that had not then been widely adopted by the library world, but which were of interest to library workers, and which have since become part of the library technology landscape (a good example of this is data visualization in D3.js, a JavaScript data visualization library).

Code4LibYEG followed up the lightning talk evening with an event devoted to APIs, focusing on Twitter and the Internet Archive, and using APIs in OpenRefine. The afternoon was split between an API-focused hackfest and a Ruby programming workshop.

The group's first two-day conference was held in 2015, which again looked at newer tools and technologies related to coding. Talks from the unconference were on functional programming with Clojure, Agile Software Development, sharing code and research with iPython notebooks, the Portland Common Data Model, and linked data. The second day was taken up with hands-on workshops, including in-depth work with robotics.

Two events were held in 2016: a workshop day in May and the second conference in November. The May workshops looked at various tools to do with markdown and static websites, as well as cleaning and visualizing data using OpenRefine and Tableau. Like all the Code4LibYEG events, these workshops were very well attended by librarians, library technicians, and other staff. The workshop day also achieved gender parity in both attendees and presenters, something of which the group is proud.

The November workshops looked again at newer technologies, such as robotics and IIIF, but also at more theoretical approaches, like library IT strategy, the "anthropological turn" in metadata modeling, and strategies for translating between librarians and technical staff.

Code4LibYEG continues to be a model for grassroots, cross-institutional collaboration in library technology and professional development in Alberta. Since its inception, it has operated on a "budgetless" model as far as possible—there are no membership fees, we use contacts in our various organizations to get free space, and events are free of charge. The only budget requirements so far have been for providing coffee. Perhaps because of this budgetless aspect, Code4LibYEG members have gotten positive feedback from the administrators in their organizations. There is no central oversight or decision-making, even with respect to the main Code4Lib community. We maintain our own local mailing list, which anyone can join. If an event is being planned, someone generally sets a date and time for an in-person meetup and anyone interested in being involved turns up there. The main Code4Lib community has always tried to have as few barriers to using the Code4Lib name as possible, and Code4LibYEG tries to make participation as barrier-free as we can as well.

Coding Workshops at University of Alberta

One of the practical problems with professional development opportunities in programming is that they either take the form of re-skilling programmes (i.e. multiweek, full-time training schemes) or 1- or 2-day introductory workshops like Ladies Learning Code (LLC) or Software Carpentry (SC). Over the past few years, both LLC and SC have established a significant presence in Edmonton and the library community. While they occupy a useful position and provide excellent opportunities, it is difficult to follow through and practice what is learned. This has been one of the most commonly heard challenges of the workshop model. To try to supplement the experiences of LLC or SC, bottom-up workshop programmes have been developed at Edmonton Public Library (by Vicky Varga in 2015) and at University of Alberta Libraries (by the author in May and June 2016).

The plan for the coding workshops at U of A was to make them open to all interested library staff, to start from the very beginning, and to make them flexible and adaptable to accommodate the needs and expectations of staff, which could change over the course of the workshop programme. Initially, all library staff were invited to an information session where we would decide together on the frequency and scheduling of the sessions, the languages to be learned, what staff wanted to get out of the workshops, etc. The information session was extremely well attended, which is an indication of how in demand such practical programming training is. The group decided to learn Python and, since the group was too big for a single cohort, to split into two staggered sessions, every other week. If this turned out to be not frequent enough for sufficient hands-on practice, then the schedule would be adjusted.

The coding workshops have proven to be popular with a core of committed staff: 43 staff members attended an information session, and 39 went on to join a Google group set up for the workshops, with almost all going on to attend the sessions. We have also supplemented Python training with other workshops, including using Git and GitHub for versioning and project management, working through practical problems for particular units to create working software, and code-reading real production applications.

The important thing from the perspective of an organizer is that these workshops were not decided on by an administrative or operational committee. They were not approved by library administration (though naturally some staff need to have supervisor approval to participate), and the decisions around how the workshops were to be structured were made collaboratively.

This way of organizing professional development while bypassing traditional organizational and decision-making structures provides a flexible, sustainable model of technology training that gives library workers the agency to see technology as something that works for them: as a tool they can use. It also gives them experience in collaborative, collegial decision-making outside the normal channels of the library hierarchy.

This type of introduction to collaborative, open-source work bodes well for the future of open, participatory, non-hierarchical, and non-siloed software development and general work culture in libraries.

Conclusion

Marx's historical materialism argues that the cultural aspects of a society (misogyny and racism, or the cultures of our organizations and professions) reflect real inequalities and exploitations at the economic level. In order to change our society, we must fundamentally change the economic dynamics in force within it. But there remains work that we can do to try to influence culture short of the complete transformation of the economic structure of society.

We often speak about the need to change our organizations, and we talk a lot about the culture of libraries. What we do not have, however, are mechanisms for change from below. Much of a given library's culture depends on the personality of the chief librarian and their relationship to the parent organization, whether that is municipal—in the case of public libraries—or a university. As recent work by Eva Revitt and Sean Luyk (2016) has shown, the commitment of academic libraries to collegial governance is honoured more in the breach than the observance.

One way in which we can build up practice and experience in decision-making is through collective action, which needs not only be directly antagonistic to library administration (as in the threat of strikes during contract negotiations at a number of Canadian institutions). Collective action can be exercised in less political areas, such as professional development. With this, both the skills to be learned and the process of learning them become ways to take agency for library workers back from administrators and technology vendors, giving library workers the tools and experience they need to potentially effect collective change in their organizations.

Ideally, the process of taking agency back in a technological context would give library workers the tools, structures, and consciousness of their own power required to take back agency in an organizational context. In *What is to be Done?*, Lenin (1902/1989) discusses the ways in which working-class consciousness comes about through the

process of struggle, the process of taking back control and agency over one's working life.

I'd like to suggest here that, in addition to the more traditional labour action currently taking place, taking control over technology through bottom-up collective action might also allow library workers to better understand and change their position within the hierarchy of university and civic administration. Fredric Jameson (2016) adopts Lenin's idea of "dual power" to refer to this process of a grassroots infrastructure existing in parallel with traditional hierarchies.

Jameson's argument is predicated on the idea that utopian thinking runs counter to the dominant logic of capitalism precisely because it is unmeasurable, non-intuitive, and unachievable.

We are all caught within the structures of capitalist economy and its intellectual requirements (measurability, efficiency, etc.), and so we must use the tools at our disposal. In this case, the tools are the technological products of a drive towards increased automation and productivity at the expense of human labour. We can resist the logic that would ordinarily go along with automation by taking control of technology for ourselves and using it to enable both dual power within our organizations as well as the kind of utopian thinking that might, one day, lead us out of capitalism altogether.

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