

**Obsolete Ideologies for the Knowledge Based Creative Economy: Essential Next Steps for Innovative Classroom Practices**

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**Abstract**

There is an inherent mismatch between the prevailing individualistic narrative implicit within the 20th century education gospel of higher skills equals better jobs equals a better economy, and the realities of the emerging knowledge-based creative economy. In this context, precarious, part-time labour persists and outsourcing of employment globally is compounded. Before broad implementation of innovative approaches within classrooms can be realized, underlying ideologies that have shaped and continue to shape education systems and policy must be surfaced and challenged, taking seriously the shifting employment landscape and social context in the enigmatic digital era.

**Two Dominant Paradigms Shaping Work and Play in the Digital Era**

In the fall of 2016 we engaged in a knowledge synthesis grant for the Social Sciences and Humanities Council of Canada (SSHRC). This synthesis explored how new technologies and Digital Taylorism, which involves the breaking down and standardizing of labour processes facilitated by now digital technologies, are changing work and society in Canada, and how education can best prepare students for the realities of the perpetually evolving and potentially enigmatic knowledge based economy. The subsequent report surfaced two dominant technological paradigms that are shaping work, play, and life in the digital era: one is that technology is replacing work through automation and Digital Taylorism; and the other is that technology is changing communication, collaboration and knowledge creation. Derived from the knowledge synthesis report, this article details these dominant technological paradigms and argues that prevailing underlying ideologies extant within the Canadian social imaginary must be surfaced and challenged, before effective implementation of innovative approaches in classrooms can occur.

### **Knowledge Synthesis Methodology**

The aforementioned SSHRC knowledge synthesis report used an intersectional framework to explore how new technologies are changing work and society in Canada, and how education can best respond to these changes. The following questions guided and framed our knowledge synthesis:

- What are the dominant technological paradigms and in what ways have they enabled and constrained the educational landscape as it pertains to the social, political, and economic relationships amongst and across populations and communities?
- In what ways is the digital variable reorienting understandings and blurring the boundaries of what counts as work or play, public or private, local or global?
- What threats and possibilities need to be surfaced so Canadians can better understand what is at stake in the relationship between education, credentialing, and expectations for meaningful employment, as well as individual, community, and societal well-being?

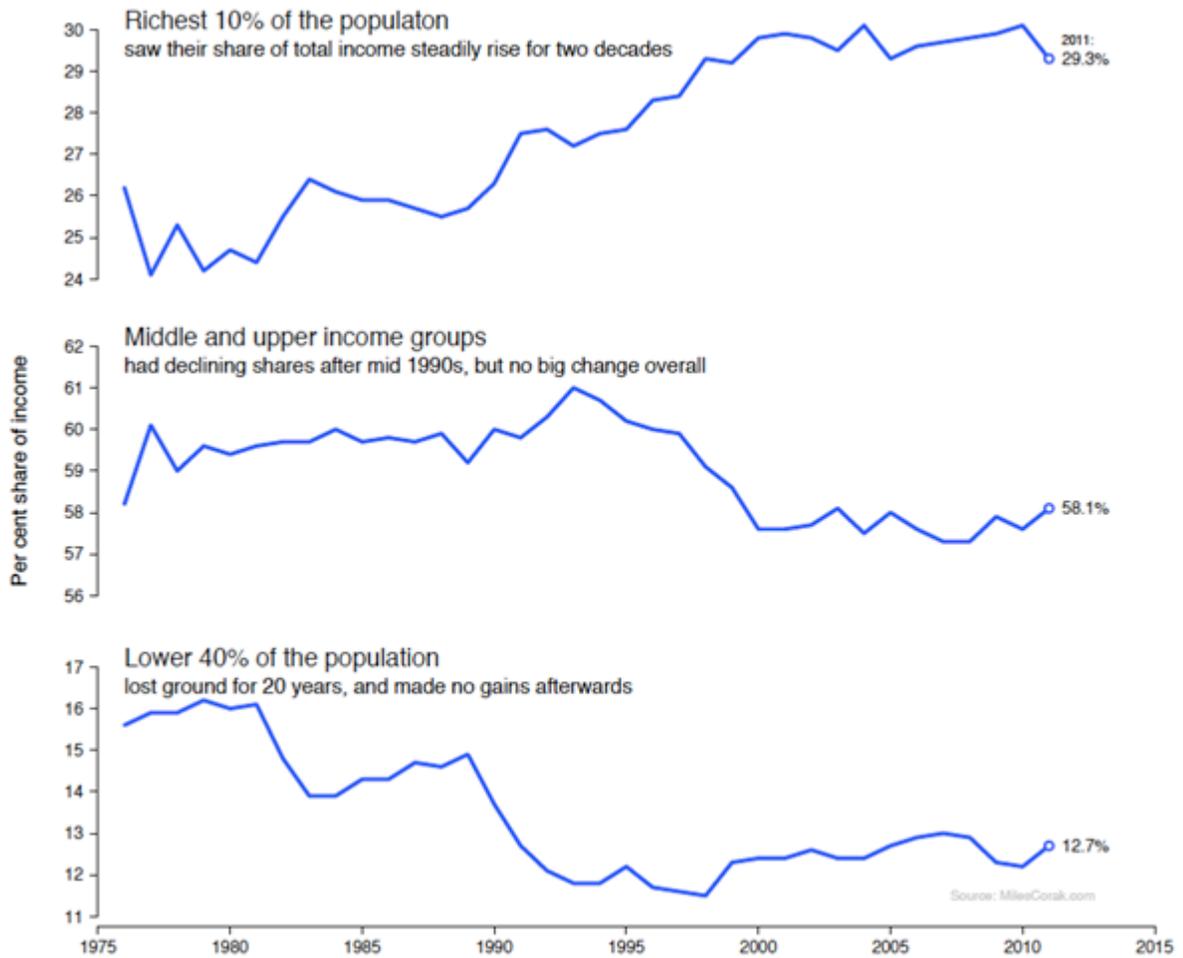
We employed a qualitative content analysis approach to systematically review and synthesize peer reviewed quantitative, qualitative, and mixed methods studies, with a primary focus on those based in a Canadian context within the past 10 years. We also collected, analysed, compared, and contrasted policy and research documents from public, private, and not-for-profit sectors (grey literature), with extant scholarly sources in education and digital economy discourses. We then juxtaposed findings from both economic and education literature, in order to identify synchronicity and/or divergence between the current educational paradigms and the digital economy discourse, and to highlight extant gaps in how these studies explore and frame education in the digital age.

The next section describes the first dominant technological paradigm, *Digital Taylorism: Technology Replacing/Simplifying Work*, followed by a discussion highlighting the implications of this labour force shift, for education systems. The second dominant technological paradigm, *Collaboration, Crowdsourcing and Globalization*, will then be outlined, culminating in a call to action toward developing education systems that resist neoliberal individualist reductionism.

**Dominant Technological Paradigm 1**  
**Digital Taylorism: Technology Replacing/Simplifying work**

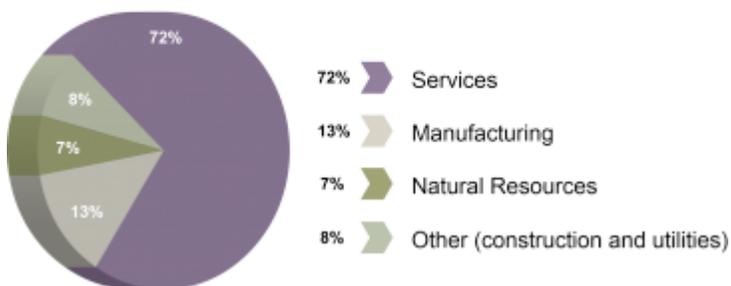
The idea that robots will eventually take over much of human labour has long been a part of our social imaginary, whether it is the Jetson's Rosie doing our household chores or self-driving cars simplifying our commute. Remarkably, these realities are either not far off, or are already taking place (see Roombas and Google cars). But what happens to the nature of work, not only for the significance it has in individual worker's lives, but its implications for society: economically, legally, politically, and educationally? Rather than simply accept that replacing human workers with new technologies is part of progress, it is important to interrogate how these transitions are unfolding. For example, until recently, low skilled workers have disproportionately borne the brunt of technological advancement, and generally as a society this displacement has met minimal resistance. As new automated technologies have dismantled and subsumed paid work, residual low skilled labour has been increasingly sent overseas, undermining the breadth and bargaining power of working class labour unions (Atkinson, 2010). While many jobs have been lost in manufacturing and primary sector industries, overwhelming increases in unemployment levels have been largely deflected by a rise in low paid service sector work (Vosko & Clark, 2009). The following two figures illustrate current income inequality trends and the significance of service sector work within the Canadian economy.

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**Figure 1: Statistics Canada data, various surveys.**  
<https://milesCorak.com/2015/08/28/who-are-the-middle-class>

## GDP per Industrial Sector - Canada



**Figure 2: Policy Horizons Canada: The Government of Canada, 2013.** (Chart adapted from: Statistics Canada, [2011](#) and [2012](#)). <http://www.horizons.gc.ca/eng/content/significant-shifts-key-economic-sectors>

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A minority creative class has improved its position in the labour market and economy in recent years. However, the majority of service sector jobs are part-time, precarious, and fall below a living wage (Policy Horizons Canada: The Government of Canada, 2013). There is an underlying perception within the Canadian social imaginary that the housekeeper replaced by ‘Rosie’, or the taxi driver ousted by the Google car, could be expected to simply ‘better themselves’ by going back to school and getting a middle class job, or more specifically, that they should have done so in the first place. Middle class cultural ideology has been a central driving force within the Canadian social imaginary since the industrial revolution brought a marked distinction between manual labour and skilled ‘white collar’ professions (Weeks, 2011). The primacy of this middle class ideal was starkly apparent most recently during the 2015 Federal election, exemplified by the Liberal Party’s platform geared toward “the middle class and those working hard to join it” (Liberal Party of Canada, 2015). This defining statement demonstrates the neoliberal underpinnings of the middle class narrative; ‘good citizens’ are those who work for pay in order to purchase goods and services indicative of a middle class lifestyle, independent of state intervention (Thorson, 2007). This laissez-faire lens supports a delineated categorization of the “deserving” and “non-deserving” poor, which has been at the heart of the gradual dismantling of the social safety net in Canada (Pupo & Duffy, 2007). This has also been an underlying rationale for systemic labour market deregulation, increasing occurrences of non-standard, flexible work arrangements, precarious jobs, international outsourcing of labour, and deunionization, disproportionately impacting low-wage workers (Atkinson, 2010; Vosko & Clark, 2009). The pervasiveness of the middle class individualistic narrative makes it easier to overlook the complex, often interconnected ways that lived experiences, social, cultural and financial capitals, and intersecting inequalities, such as race, gender, sexuality and socio-economic status, create challenges and barriers to attaining and maintaining a ‘middle class’ lifestyle.

The introduction of new digital technologies has intensified work standardization, surveillance, and employee time management in a wide range of employment areas (Parenti, 2001). Notably, standardization and lean management approaches have not been restricted to manufacturing and primary sectors. For example, cutbacks in front line health care and social services have led to the implementation of new organizational methods that strive to break down emotional labour and caring work into measurable cost-effective segments, resulting in job

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losses and increased worker stress and burnout for those remaining in these sectors (Cumella, 2008). Though jobs in health care and social services have represented some of the highest paying, most stable of professions dominated by women, they tend to fall outside the social imaginary of the middle class ideal, and as such, job losses in these areas have been insufficient to challenge the underlying neoliberal narrative. Many of these positions involve characteristics indicative of working class jobs (i.e. physical labour, irregular hours, and lower pay than most white collar, middle class professions). Furthermore, though caring work can be fragmented and intensified, it cannot be replaced completely because it is primarily location specific, and, as such, cannot be outsourced overseas (though employing low paid temporary foreign workers adds an additional problematic layer to consider). Caring work also involves skills in empathy and human connectivity that are currently beyond the reach of modern digital technologies, highlighting the need for traits and abilities that are uniquely human within the modern day labour market. However, the tasks that fall under ‘uniquely human’ are constantly being re-evaluated as new technologies challenge assumptions of how and why caring processes might be simplified and/or automated. For example, researchers at the University of Prince Edward Island (UPEI) are currently testing the effectiveness of a software application that provides addictions treatment (Day, 2015, December). If successful, this online software program could increase access for diverse populations and those who may be more comfortable with a digital counselling format, as well as more easily provide the service in more remote areas. It is not difficult to imagine how this type of program could reduce the number of front line counselling staff, with only the most extreme cases requiring specialized human interaction and support.

As new digital technologies continue to develop and permeate domains beyond routine tasks (Frey & Osborne, 2013), workers across the employment hierarchy, including those working traditionally middle class positions that seemed largely beyond the reach of taylorism, are at risk of their jobs being outsourced or of becoming obsolete (Beck, 2000; Lewchuck & Lafleche, 2014). One need go no further than the grocery store self-checkout to see how new technologies have and are changing service industries. However, automated service technologies are quickly moving into areas traditionally assumed to be stable, middle class, ‘skilled’ employment. For example, McFeat (2016) interviewed Mike Katchen, the CEO of Wealthsimple, the biggest robo-adviser firm in Canada, and Randy Crass, CEO of Nest Wealth, a Toronto-based robo-adviser firm, to discuss the ways software algorithms are being used as

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‘robo-advisers’ to work with clients to track investment portfolios. Legal professions offer another example of technology subsuming white collar, middle class paid work. Many repetitive, methodical tasks, such as scanning documents or data mining, can be more quickly and easily accomplished by tireless algorithmic programs (Frey & Osborne, 2013). For these types of routine tasks, algorithms not only offer a cost saving alternative to human labour, they are often able to outperform human workers (Turk, 2014, December). Similar to the robo-advisor example above, it has taken very little in terms of actual machine learning to circumvent middle class entry level positions, creating precarious employment conditions for many young people (Wiebe & Altass, accepted, manuscript in preparation). The expansion and ease of access to big data and the Internet, provide the basis for creating machine learning algorithms that are increasingly able to achieve a wide range of complex tasks independently (Frey & Osborne, 2013), including “recognizing street signs, parsing human speech, identifying credit fraud, modeling how materials will behave under different conditions, and more” (McAfee & Brynjolfsson, 2016, p. 140). In the field of law, intelligent algorithms have opened the door to the automation of more complex legal tasks, such as e-discovery and predicting the likely success or failure of a perspective lawsuit, often more efficiently and successfully than their human counterparts (Katz, Bommarito & Blackman, 2014). Using IBM’s Watson computer as its foundation, ROSS is an AI lawyer that can simultaneously and perpetually perform many tasks traditionally delegated to legal (human) associates (ROSS: Do more than humanly possible, 2017). Though law firms are hiring fewer and fewer legal assistants, paralegals, and entry level lawyers, the uniquely human abilities of the most highly qualified lawyers at the top of the legal profession are still, and will continue to be, needed (Turk, 2014, December). However, as the number of skilled, experienced lawyers needed continues to decrease, lower level paid opportunities to gain the experience needed to develop advanced skills in lawyering are being subsumed by digital technologies. If the outcomes of technological displacement of work in other professions are any indication (i.e. increased demand for worker flexibility and in precarious work), it is likely that as entry level positions continue to disappear, the ultimate responsibility and cost to update and maintain skills and knowledge will be downloaded to individual workers (Beck, 2000). Only a privileged few will be able to break into the remaining higher level positions.

### **Educating for an Automated Future**

A plethora of educational scholarship has explored innovative classroom practices at pace with technological change. However, compounding evidence that work across the employment spectrum, including in digital fields, is being increasingly disrupted and displaced by new technologies has, to date, erroneously remained tangential. With so many jobs being streamlined and subsumed by new technologies, it is easy to assume that the most secure path to future employment is through learning to work with and develop these new technologies. In fact, the Information and Communications Council of Canada predicts that “under a baseline scenario, cumulative hiring requirements in Canada for Information and Communication Technology (ICT) talent are expected to be 182,000 by 2019” (Faisal et al., 2015, p. X), which on the surface seems promising. However, in terms of long term employment prospects, the significance of this number may be misleading. Considering that the Canadian economy lost over 31,000 jobs in July 2016 alone, the majority of which were full time, permanent positions, while youth employment also decreased (Statistics Canada, 2016, July), a possible increase of 182,000 jobs of unknown duration and precariousness over five years seems pretty bleak. That jobs in ICT are overwhelmingly dominated by older men adds an additional problematic layer for many future job seekers. Indeed, Faisal et al. (2015) identify that three out of four ICT professionals are men, and only one out of every twenty are below the age of 25. Furthermore, of these 182,000 prospective future jobs, almost 100,000 are attributed to replacement requirements as current ICT professionals retire, a brazen assumption, considering that new technologies are regularly simplifying or replacing paid work, including in ICT. For example, software engineers, who can be considered at the top of the ICT employment hierarchy, are at high risk of becoming redundant in their positions simply by the nature of the work itself (i.e. creating software to simplify, automate, and in terms of intelligent algorithms, act independently). It stands to reason that if software engineers are not working themselves out of a job, then they are probably not doing their job very well. Once the software infrastructure is in place, any residual maintenance or monitoring work can often be done by a small number of low waged workers, if any human workers are required at all. In light of the realities of technological development and displacement, it is ethically irresponsible to continue propagating a message that acquiring new technological skills is some kind of guarantee of future employment for young people. We are calling for policies and courses that more honestly portray the working conditions today’s young

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people are facing, which will have implications across the curriculum. Increased emphasis must be placed on the need for diverse individuals to develop and maintain the capacity to understand and critically engage with the forms and applications of new technologies as they emerge, in order to be informed participants within 21st century democratic society.

### **Dominant Technological Paradigm 2 Collaboration, Crowdsourcing and Globalization**

Internet technologies allow for connection and collaboration with diverse global audiences (Hull & Stornaiuolo, 2014). Pellegrino and Hilton (2012) identify that:

The pervasive spread of digital technologies has increased the pace at which individuals communicate and exchange information, requiring competence in processing multiple forms of information to accomplish tasks that may be distributed across contexts that include home, school, workplace, and social networks. (p. 3)

Today's youth have grown up with the internet and spend more time online than any other age group (Leu et al., 2011). However, many fail to identify the need for critical analysis, and lack the ability to critically evaluate information and sources online (Hubert & Lewis, 2014). For example, many are not aware that while Wikipedia and similar sites often contain accurate and useful information, user-generated content formats may also be unreliable, inaccurate, or biased (Ayers, 2010; Harouni, 2009). Furthermore, issues of data ownership and plagiarism in digital media can also be complex and perplexing (Evering & Moorman, 2012).

Internet technologies have also changed and are changing work: the way we work, the types of work one can engage in, and from where. For example, media production, publication, and distribution has been thoroughly disrupted and reimagined by digital technologies and social media. With the growing availability, affordability, and accessibility of personal computers and smartphone technologies, established media sources, such as newspapers, books, radio, and TV, no longer hold a monopoly on the public distribution, or even production of information. Software programs that can write original news articles based on current events are already being used by mainstream media outlets to monitor and produce content on everything from sports and weather to economic market trends. In fact, though newspaper articles written by algorithms are

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primarily descriptive and formulaic, Clerwell (2014) found that these articles are often indiscernible from human-generated content. Furthermore, many readers today consider computer-generated content to be more credible and objective than content produced by human authors (Clerwell, 2014). The collective impact of the unprecedented internet access to information sources (of varying quality and reliability), citizen lead social media, and algorithm-writing bots on the media industry has been substantial, as more and more local news outlets and TV stations continue to be downsized or closed completely, resulting in unprecedented job losses and limiting paid opportunities for future workers (Lareau, 2010).

Globalization of work has also been expanded and intensified by internet communication technologies, facilitating increased globalization of work for workers across the employment hierarchy (Collins, 2013). Wiebe and Altass (accepted, manuscript in preparation) identify that the current technology driven dynamic expansion in globalized work is primarily facilitated by two factors: first, ICT technologies, such as bandwidth, processing, storage and cloud computing, are rapidly becoming better and cheaper, transforming and growing the types of work that can be done remotely for less (McAfee & Brynjolfsson, 2016); concurrently, the governments of emerging economies, such as China and India, are proactively investing in advanced ICT and engineering education, creating a high-skill, low-wage globally competitive workforce (Brown, Lauder, & Ashton, 2011). “While a few ICT based companies may utilize locally sourced workers to meet a niche consumer market, within the existing capitalist market structure, the majority of companies can be expected to seek out the lowest cost option globally and outsource work, whenever possible” (Wiebe & Altass, accepted, manuscript in preparation).

Existing and emerging digital tools and hybrid genres are sites of open and interactive knowledge creation and collaboration, occurring across globally networked and interconnected systems (Williamson, 2013). These technological advances have expanded the range of possibilities for fragmented work arrangements and crowdsourcing of work, parceled out over vast distances. To date, many of the underlying impacts of traditional Taylorism have remained salient within this new digital genre: increases in required worker flexibility and precariousness of work, decreases in remuneration for work and cost savings for employers, and downloading of responsibility for training and skill enhancement to individual workers (Barnes, Green, & Hoyos, 2015). Furthermore, some crowdsourced projects make use of voluntarily shared, user-generated contributions and/or data, for which no remuneration is required, which further detracts from the

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availability and stability of paid employment in this sector. However, crowdsourcing also provides some interesting and unique implications for work processes and outputs, challenging the fundamental notion of work as a primarily market driven activity. For example, online communities of computer programmers from across the globe regularly collaborate, without remuneration, on open source projects like Apache and Linux (Shirky, 2010). These types of voluntary collaborations for a greater good offer new possibilities for expanding the space between work and play, representing a decreased focus on individual gain.

### **Education Systems and Policy: Surfacing Underlying Ideologies**

Given the impact of digital technologies, there is an urgent need for identifying and facing the underlying ideological assumptions upon which extant education policy has been built. Altass and Wiebe (in press) argue there are two prevailing political and cultural narratives that have shaped education to date: One, meritocracy as the primary effective means to the middle class (Loveday, 2015), which for education means higher skills equals better jobs and a better economy, and that individuals are, and should, be independently responsible for their own wellbeing and success (i.e. neoliberalism) (Corman & Luxton, 2007); and two, progress, including technological progress, is inevitable, thus taking away the responsibility of society to actively engage in making decisions about the future (Hornborg, 2014). Paradoxically, these narratives are generally only vaguely defined and rarely discussed outside of the critical literature.

Before rushing into the changes in practice, it is imperative to consider the underlying ideologies that are driving current practices. For example, the continued overreliance on standardized testing is derivative of an underlying neoliberal individualist narrative. This is clearly a mismatch with the development of innovation, collaboration, and social and emotional skills that are highly desired for work and life within the Knowledge Based Creative Economy (KBCE) (Levin, 2012), and for informed and engaged participation in democratic society (Beane, 2005). For innovation to take place in practice, it is critical that underlying assumptions and ideologies tethered to a pre-digital era are surfaced, critically evaluated and restructured, or disregarded accordingly.

To advance education systems and policy for the realities of the emerging KBCE, the following changes are recommended:

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- Reduce standardized testing and create district-wide digital learning portfolios, which offer a more holistic, multifaceted, and pragmatic assessment approach (Hubert & Lewis, 2014).
- Place ‘soft skills’ and inter/intrapersonal development at the forefront through student centered approaches that encourage the interests, creativity and agency, in consort with collaborative decision making and democratic engagement (Baeten, Kyndt, Struyven, & Dochy, 2010).
- Integrate social and emotional learning outcomes into the curriculum and education policy, and develop courses specifically designed to advance innovation, collaboration, and social and emotional learning (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).
- Implement a holistic, threshold concept approach to curriculum development that focuses educational policy and practice on the complexity and transdisciplinary nature of knowledge (Meyer & Land, 2006).

Educational change cannot be understood outside the larger political and economic paradigm of preparing a future workforce and future citizens to take up their lives. Before discussing the many great individual examples of innovation within classrooms, it is imperative that we identify and challenge the inherent mismatch between the economic prospects for young people within the evolving labour market, and the prevailing neoliberal individualistic narrative that has shaped and continues to shape education systems and policy. As broad problematic trends in the domestic labour market persist, such as increased part-time, contract and precarious work, and decreased unionization (Woodman, 2012), the dynamic global technoscape further disrupts and dismantles work in Canada as nationally bounded, increasing competition for work, and limiting opportunities for workers across the employment hierarchy (Brown et al., 2011). Despite the clear trend of technology, particularly digital technology, putting downward pressure on labour, the 20th century education gospel of higher skills equals better jobs equals a better economy remains resolute within education research and practice. The difficulty of previous educational reform efforts is that they have typically been envisioned as changes in the classroom with isolated, easily measurable outcomes. This narrow approach makes education a technical

endeavour. Should Canada desire to become a world leader in education, a systemic integrated response (i.e. a paradigm shift) is required.

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### References

- Altass, P., & Wiebe, S. (in press). Re-imagining education systems and policy in the digital era. *Journal of the Canadian Association of Curriculum Studies*.
- Atkinson, W. (2010). The myth of the reflexive worker: Class and work histories in neoliberal times. *Work, Employment and Society*, 24(3), 413-429.
- Ayers, W. (2010). Teaching in and for a democracy. *Curriculum and Teaching Dialogue*, 12(1-2), 3-10.
- Baeten, M., Kyndt, E., Struyven, K., & Dochy, F. (2010). Using student-centred learning environments to stimulate deep approaches to learning: Factors encouraging or discouraging their effectiveness. *Educational Research Review*, 5(1), 243-260.
- Barnes, S. A., Green, A., & Hoyos, M. (2015). Crowdsourcing and work: Individual factors and circumstances influencing employability. *New Technology, Work and Employment*, 30(1), 16-31.
- Beane, J. A. (2005). *A reason to teach: Creating classrooms of dignity and hope*. Portsmouth, NH: Heinemann.
- Beck, U. (2000). *The brave new world of work*. (P. Camiller, Trans.). Malden, MA: Blackwell Publishers Inc.
- Brown, P., Lauder, H., & Ashton, D. (2011). *The global auction: The broken promises of education, jobs, and incomes*. New York, NY: Oxford University Press.
- Clerwell, C. (2014). Enter the robot journalist. *Journalism Practice*, 8(5), 519-531.
- Collins, R. (2013). The end of middle-class work: No more escapes. In I. Wallerstein, R. Collins, M. Mann, G. Derluguian, & C. Calhoun (Eds.), *Does capitalism have a future?* (pp. 37-69). New York, NY: Oxford University Press.
- Corak, M. Statistics Canada data, various surveys. Retrieved from <https://mileskorak.com/2015/08/28/who-are-the-middle-class>

- Corman, J., & Luxton, M. (2007). Social reproduction and the changing dynamics of unpaid household and caregiving work. In V. Shalla, & W. Clement (Eds.), *Work in tumultuous times: Critical perspectives*. (pp. 262-288). Montreal and Kingston: McGill-Queen's University Press.
- Cumella, S. (2008). New public management and public services for people with intellectual disability: A review of the implementation of 'valuing people' in England. *Journal of Policy and Practice in Intellectual Disabilities*, 5(3), 178-86.
- Day, J. (2015, December). Online addictions treatment program being tested in P.E.I. *The Guardian Newspaper, PEI*. Retrieved from <http://www.theguardian.pe.ca/news/local/online-addictions-treatment-program-being-tested-in-pe-i-100709/>
- Durlak, J. A., Weissberg, R.P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, 82(1), 405-432.
- Evering, L. C., & Moorman, G. (2012). Rethinking plagiarism in the digital age. *Journal of Adolescent and Adult Literacy*, 56(1), 35-44.
- Faisal, S., Asliturk, E., Bourgi, S., Savard, A., Aquilina, A., & Castillo, D. D. (2015). *The smart economy reshaping Canada's workforce: Labour market outlook 2015-2019*. The Information and Communications Technology Council.
- Frey, C. B., & Osborne, M. A. (2013). *The future of employment: How susceptible are jobs to computerization?* Oxford Martin School. Oxford, UK: Oxford University Press.
- Harouni, H., (2009). High school research and critical literacy: Social studies with and despite Wikipedia. *Harvard Education Review*, 79(3), 437-493.
- Hornborg, A. (2014). Technology as fetish: Marx, Latour, and the cultural foundations of capitalism. *Theory Culture Society*, 31(4), 119-140.
- Hubert, D. A., & Lewis, K. J. (2014). A framework for general education assessment: Assessing information literacy and quantitative literacy with ePortfolios. *International Journal of ePortfolio*, 4(1), 61-71.
- Hull, G. A., & Stornaiuolo, A. (2014). Cosmopolitan literacies, social networks, and 'proper distance': Striving to understand in a global world. *Curriculum Inquiry*, 44(1), 15-43.
- Katz, D. M., Bommarito, M. J., & Blackman, J. (2014). Predicting the behavior of the Supreme Court of the United States: A general approach. *Social Science Research Network*. [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2463244](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2463244)
- Lareau, L. (2010). The impact of digital technology on media workers: Life has completely changed. *Ephemera*, 10(3/4), 522-525.
- Levin, H. M. (2012). More than just test scores. *Prospects*, 42(1), 269-284.
- Lewchuk, W., & Lafleche, M. (2014). Precarious employment and social outcomes. *Just Labour: A Canadian Journal of Work and Society*, 22(1), 45-50.
- Liberal Party of Canada. (2015). Real change: A new plan for a strong middle class. Retrieved from [www.liberal.ca/files/2015/10/New-plan-for-a-strong-middle-class.pdf](http://www.liberal.ca/files/2015/10/New-plan-for-a-strong-middle-class.pdf)
- Loveday, V. (2015). Working-class participation, middle-class aspiration? Value, upward mobility and symbolic indebtedness in higher education. *The Sociological Review*, 63(3), 570-588.
- McAfee, A., & Brynjolfsson, E. (2016). Human work in the robotic future: Policy for the age of automation. *Foreign Affairs*, 95(4), 139-150.

- McFeat, T. (2016, January). Robo-advisers come of age as cost disclosure rules loom. *CBC Business Review, Special Report*. Retrieved from <http://www.cbc.ca/news/business/rrsp/robo-advisers-low-cost-1.3398787?cmp=rss>
- Meyer, J. H. F., & Land, R. (2006). Editors' preface. In J. H. F. Meyer, & R. Lund (Eds.), *Overcoming barriers to student understanding: Threshold concepts and troublesome knowledge* (pp. xiii-xxiii). New York, NY: Routledge Taylor and Francis Group.
- Parenti, C. (2001). High-tech workplace surveillance is the hallmark of a new digital taylorism: Big Brother's corporate cousin. *The Nation*, 6(13), 27-30.
- Pellegrino, J. W., & Hilton, M. (2012). Education for life and work: Developing transferable knowledge and skills in the 21st century. *Committee on Defining Deeper Learning and 21st Century Skills*. Washington, DC: The National Academic Press.
- Policy Horizons Canada: The Government of Canada, 2013. (Chart Adapted from: Statistics Canada, 2011 and 2012). Retrieved from <http://www.horizons.gc.ca/eng/content/significant-shifts-key-economic-sectors>
- Pupo, N., & Duffy, A. (2007). Blurring the distinction between public and private spheres: The commodification of household work – gender, class, community and global dimensions. In V. Shalla, & W. Clement (Eds.), *Work in tumultuous times: Critical perspectives* (pp. 289-325). Montreal, QB: McGill-Queen's University Press.
- ROSS: Do more than humanly possible. (2017). Retrieved from <http://www.rossintelligence.com>
- Shirky, C. (2010). *Cognitive surplus: Creativity and generosity in a connected age*. New York, NY: Penguin Books Ltd.
- Statistics Canada. (2016, July). Labour Force Survey. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/160805/dq160805a-eng.htm>
- Thorsen, D. E. (2010). The neoliberal challenge: What is neoliberalism? *Contemporary Readings in Law and Social Justice*, 2(2), 188-214.
- Turk, V. (2014, December). Your lawyer may soon be an algorithm. *Motherboard, Vice*. Retrieved from <http://motherboard.vice.com/read/your-lawyer-may-soon-be-an-algorithm>
- Vosko, L. F., & Clark, L. F. (2009). Canada: Gendered precariousness and social reproduction. In L. F. Vosko, M. MacDonald, & I. Campbell (Eds.), *Gender and the contours of precarious employment* (pp. 26-42). New York, NY: Routledge, IAFFE.
- Weeks, K. (2011). *The problem with work*. Durham, NC: Duke University Press.
- Wiebe, S., & Altass, P. (accepted, manuscript in preparation). *New literacies threshold concepts: A guide for teachers*. Charlottetown, PEI: Island Studies Press.
- Williamson, B. (2013). *The future of curriculum: School knowledge in a digital age*. Cambridge, MA: The MIT Press.
- Woodman, D. (2012). Life out of sync: How new patterns of further education and the rise of precarious employment are reshaping young people's relationships. *Sociology*, 46(6), 1074-1090.