Taylorizing Academia, Deskilling Professors and Automating Higher Education: The Recent Role of MOOCs

Tanner Mirrlees and Shahid Alvi, University of Ontario Institute of Technology, Canada

Abstract

Since 2012, corporations, politicians, journalists and educators have asserted that MOOCs—massive open online courses—are radically changing North American and global education, and for the better. This article offers a counterpoint to the techno-deterministic and optimistic buzz surrounding for-profit MOOCs by contextualizing and analyzing MOOCs with respect to the forces and relations of capitalism, Taylorist managerial strategies, longstanding attempts by U.S. university managers to apply new communication technology to the educational labor process as a way of making it more "efficient" and the often fraught power relations between university managers and teachers. We contend that MOOCs represent the latest attempt in a long history of Taylorist managerial efforts to make education more "efficient" by getting fewer and fewer professors to teach more and more students with less resources and at a lower cost. Our conclusion calls for the "democratization" of the MOOC.

Key Words: massive open online course (MOOC), educational technology, political-economy of communication technology, Harry Braverman, Taylorism, neoliberalism, digital capitalism

Introduction: Beyond the MOOC Buzz

The consequence of the substitution of technology for pedagogy is that instrumental goals replace ethical and political considerations, diminishing classroom control by teachers while offering a dehumanizing pedagogy for students (Giroux, 2007, 124)

Since 2012, MOOC firms, businesses, journalists and educators have asserted that MOOCs—massive open online courses—are radically changing North American and global education, and for the better. The website for the MOOC firm Udacity says Udacity is the "future of online higher education" and that it is "reinventing education for the 21st century" by "offer[ing] accessibly, affordable, engaging classes that anyone can take, anytime" (About us, 2013). The website for Coursera, another MOOC company, says Coursera "envision[s] a future where everyone has access to a world class education that has so far been available to a select few" and aims to "empower people with education that will improve their lives, the lives of their families, and the communities they live in"(About Coursera, 2013). Newspapers echo Udacity and Coursera's excitement about the MOOCs' disruption and transformation of existing educational models (Stevens 2012). The New York Times declared 2012 to be "The Year of the MOOC" (Pappano, 2012) and the opinion-maker, Thomas Friedman (2013), boasted that a MOOC revolution is "here and real". Business leaders from the high-tech industry also tout the power of the MOOCs. Silicon Valley icon and Microsoft Chairman Bill Gates avers that because of MOOCs "we're on the beginning of something very profound" and that this is the "golden era" of education, thanks to MOOCs, which are becoming "a global phenomenon" (Grossman, 2013). According to their advocates, MOOCs are something that we all should celebrate and embrace, as they will take us into a future in which education is better than before.

What are MOOCs? MOOCs are basically online courses offered by profit and not-for-profit companies in partnership with U.S. universities like Harvard, Stanford and MIT that can be taken by students, at a distance from a university's campus. A MOOC is "Massive" because it can enroll hundreds, even hundreds of thousands of students, simultaneously; it is "open" because anyone with a computer, an Internet connection and Net literacy skills can take it; it is "Online" because course materials (lectures, tests, assignments) are digitized, delivered, accessed and interacted with

in Web-based computer mediated environments; and it is a "Course" because it can be assessed for credit or recognition (Heller, 2013). The MOOC educational experience is designed to work like this: students go to a MOOC provider website (i.e. https://www.udacity.com/ or https://www.coursera.org/) browse through university catalogues of course offerings in various subjects, select and enroll in a course, and then take it. When taking MOOC courses, students watch pre-recorded and often short videos of lectures by professors, take tests and quizzes, complete assignments and virtually interact with classmates through chat forums and message boards. Upon successfully completing their course work, students pass the course and then receive recognition (but usually not course credit toward their university degree).

In this paper, we critique the notion that educational change is being caused by new technology, not social relations between people, arguing that MOOCs have been abstracted from the material world of corporations, states and the people that shape them to ends they decide. The oft-repeated notion that MOOCs are good for everyone—businesses, administrators, professors and students alike—is a techno-utopian claim that obscures how new technology may serve the power interests of some and disadvantage others (Postman, 1998). While there is much to be learned regarding the pedagogical efficacy of non-profit MOOCs, here, we pay attention to a hitherto under-examined set of consequences emanating from the emergence of capitalist MOOC corporations. More specifically, the goal of this article is to offer a counterpoint to the techno-deterministic and optimistic buzz surrounding for-profit MOOCs by contextualizing and analyzing them with respect to the history of U.S. capitalism, Taylorist managerial strategies, longstanding attempts by U.S. university managers to apply new communication technology to the educational labor process as a way of making it more "efficient" and the sometimes fraught power relations and conflicts between university managers and teachers.

To achieve our goal, this article's first and second section introduces our political-economic method for analyzing the MOOC and especially, this method's grounding in a neo-Marxian theory of technology, management and class power. The third section places the MOOC on a historical continuum of attempts by U.S. corporations, educational reformers and cash-strapped university administrators to Taylorize education by applying "new" communication technologies to the academic labor process. While much techno-deterministic buzz emphasizes the newness of MOOCs, we contend that MOOCs represent the latest attempt, in a long history of Taylorist managerial efforts, to make education more "efficient" by getting fewer and fewer professors to teach more and more students with less resources and at a lower cost. And against the techno-optimists who champion the MOOC as good for everyone, we contend MOOCs may adversely affect the livelihood and labor process of teachers. Overall, we argue that the MOOC is a tool of managerial power used to deskill teachers and automate the work of teaching; it serves as the latest ostensible technological fix to the economic problems of higher education in a period of neoliberalism and austerity. In the article's conclusion, we call for the "democratization" of the MOOC.

The Political Economy of New Communication Technology
This article's analysis of the MOOC is grounded in the political economy of communications method, which, for our purposes, connotes a historical, holistic, moralistic and practical-political approach to new technology (Wasko, Murdock and Sousa, 2011, p. 2).

Rooted in 18th century moral philosophy, the analysis of production and consumption relations, and here, linked in particular to the work of Marx, the political economy method is historical, meaning that rather "than concentrating primarily on immediate events, it insists that a full understanding of contemporary shifts must be grounded in an analysis of transformations, shifts, and contradictions that unfold over long loops of time" (Wasko, Murdock and Sousa, 2011, p. 2). Political-economists recognize the importance of trying to

understand how new communication technology may be changing the world, but view the narrow fixation only on "what's going on now" at the expense of a broad account of "what came before" as a major cognitive problem that is typical of "present-minded" postmodern and late capitalist societies (Jameson, 1991). To avoid present-mindedness, political economists analyze the past in the present of technology, that is, how an ostensibly "new" communication technology may maintain, extend or transform longstanding social power relations. Following this methodological tenet, we are interested in the dialectic of continuity and change surrounding attempts to transform educational institutions and the quality of education with new technology. We ask historical questions of the present-minded discourse surrounding MOOCs: are MOOCs as radically "new" as some say they are and if not, what are their technological antecedents? Did communication technologies thought to be "new" in previous epochs radically disrupt existing models of college and university education? These questions encourage us to place the buzz surrounding the MOOC on a continuum of historical attempts to transform education with apparently "new" communication technologies.

The political-economy method is holistic in that instead of conceptualizing new communication technology as an agent that possesses the power to change the world (technological determinism) or as a value-neutral tool used for whatever ends whichever user decides (technological instrumentalism), it focuses on technology as the outcome and tool of the large-scale economic and political organizations that conceptualize, develop, distribute and use it. Technology is part and product of society and as such, something that is best understood and explained with reference to the choices, interests and actions of society's powerful economic and political organizations—corporate and state institutions specifically. A society's need for technology is never pre-given or universally apparent, but something defined by a network of organizations within society that have the capacity to define a need and the best means of meeting it. Also, political economists conceptualize communication technology as an instrument of

power that can be used to advance the interests of some at the expense of others and are attentive to how the benefits and costs of new technology are unevenly distributed in society. With this tenet in mind, we examine the MOOCs design as the outcome of the choices, goals and interests of the organizations and interest groups responsible for developing it. We ask questions like: what particular organizations are promoting the diffusion of MOOCs? What interests do they pursue in doing so? Whose ends are MOOCs designed to fulfill? At what cost and at whose expense might MOOCs be developed and implemented in society? By attempting to answer these kinds of questions, we aim to move beyond the buzz surrounding MOOCs and put critical pressure on those who frame them as either a rational response to the universal needs of students or as autonomous agents that are beyond human control and fundamentally transforming education.

The political economy method is also concerned "with the relations between the organization of culture and communications and the constitution of the good society grounded in social justice and democratic practice" (Wasko, Murdock and Sousa, 2011, p. 1). Political economists ask moral and ethical questions such as: what is a good society? What values does new technology uphold or challenge? What values should the design of a new technology express? What ends should we direct our new communication technology toward? These kinds of moral and ethical questions are at the heart of efforts to democratize technology and society. When we judge technology—its development, use and effects—we are making a judgement about how we want to live with technology and the kind of society we want to live in. Technology is deeply political (it is shaped and used by different groups in society to serve their interests), politically consequential (it is part of society and capable of changing it, for better or worse), and is always being judged by political actors (most of the time, by technocratic elites, but sometimes, by broader publics) (Barney, 2007). When political economists judge new technology, they do so with respect to its ability to support or undermine progressive values like social justice, social equality and deliberative democracy. By judging

technology, political economists place technology in the public sphere, exercise their rights as citizens to express critical opinions, take part in shaping the process through which technological development moves forward or is stalled and participate in debates about the allocation of public resources to technological R&D, policy formation and regulation. With regard to this tenet, we ask questions of MOOCs like: what values do MOOCs express? What ends are MOOCs being directed toward? Do they help or hinder social justice, equality and democracy in education? Just because we can employ MOOCs in higher education, should we? Moreover, could MOOCs be re-designed to support ends not determined or anticipated by the organizations currently promoting them?

The political economy method "place[s] its practitioners under an obligation to follow the logic of their [critical] analysis into practical action for change" (Wasko, Murdock and Sousa 2011, p. 2). Political economists support the idea that academic research ought to try to understand the world (and the role of technology in it), and in doing so, preserve or change it in some way, for the better. In this article, our analysis of MOOCs aims to encourage education policy-makers, university administrators, professors and students to "proceed with caution" (Alvi, 2011) before embracing every new tool that is marketed to them as a fix to current problems. Our analysis is guided by the goal of democratizing education and society.

Neo-Marxist Theory: Technology, Management and Class Power

Our political-economic method for analyzing the MOOC links with neo-Marxist theories of technology and class power. Marx "wrote variously about technology, making statements that cannot all be reconciled one with another—or at least, can be reconciled in very different, sometimes radically opposed, ways"(Dyer-Witheford, 1999, p. 38), but in this article, we contribute to a rich Marxist tradition of conceptualizing technology as an instrument that institutional elites use to control the labour process of workers in a period in which the managerial principles of Fredrick W. Taylor are no longer contained by the factory but are now generalized

throughout all of society—including academia (Braverman, 1974; Noble, 1977, 1979, 1984, 1995; Webster and Robins, 1986, 1999). This neo-Marxist theory views conflict between owners (represented by managerial elites) and workers over the labor process, not new technology, as a force of change in society's dominant institutions and society more broadly. For Marxists, owners aim to maximize profits by trying to squeeze more value from workers than they return to them in the form of wages; workers try to resist this process by fighting for more humane and equitable work conditions. In this context, the power relationship between owners and their new technology and workers and their skill is antagonistic; new technology often "acts as a competitor who gets the better of the workman [sic], and is constantly on the point of making him superfluous"(Marx, 1983, p. 410). Owners re-invest a portion of the surplus they accumulate into the development and acquisition of new technological innovations that are designed to create production efficiencies while managerial elites use the new machines to standardize the labor process, deskill workers and automate their work, leaving people unemployed and part of a large reserve army of labour. In struggles between the owning class (the owners of the means of production) and the working classes (people who sell their labor power to owners in exchange for a wage as a way to meet their subsistence needs), technology is designed to take sides—most often, the side of the owners and managers.

During the U.S.'s industrial revolution, engineers were hired by the owners of large-scale U.S. corporations to solve human relations problems for them, namely, the "man problem": worker resistance to the unequal terms of exchange with owners (i.e. exploitation) (Noble, 1977, p. 258). In response to "man problems" like soldiering, machine sabotage, and trade-union formation, owners tasked engineers with trying to figure out how to stave off class conflict by designing and effectively managing the behavior of workers (Noble, 1977, p. 264). Fredrick W. Taylor (1911), the most renowned of these engineers, turned management into a science. Taylor said that owners could minimize class conflict and increase

efficiencies in their factories by studying the labor process in minute detail, determining the one best way to do a job and then imposing this new standard upon workers. Taylor's "Scientific Management" aimed at maximizing the productivity of workers by increasing their "efficiency" while minimizing their proclivity to waste time, resources and energy. In general, efficiency refers to the optimum means to reach a specific end rapidly, with the least amount of cost or effort required. In the context of early industrial capitalism, efficiency was a code word for managerial strategies that aimed to get the fewest amount of workers to do more work in shorter periods of time and for less pay (Noble, 1984). Taylor advised managers to increase production efficiencies, first by collecting data about the machines and the workers, then by deriving from this data optimum standards of performance for the machines and the workers, and finally, by applying this standard to the total labor process. By advising managers to break down production into small and repetitive steps, Taylorism divorced the conceptualization of the work process from the workers themselves and put it in the control of managers. By standardizing the steps in any production process, Taylorism made it possible for managers to easily train and replace workers, thereby undermining their skill set and bargaining power. Taylorism taught owners that the labor process could be engineered and that workers could be replaced, just like the machines that workers used to assemble goods. Taylorism had the effect of deskilling workers and degrading their experience of work (Braverman, 1974).

In the hands of Taylorist managers and designed to be of use to them, new technology often became "the prime means" of controlling production" (Braverman, 1974, 193). After determining the "one best way" to do a job, managers searched for even greater production efficiencies in the form of new technology, which was developed and sold to their respective firms by others. Throughout the 20th century, ongoing technological innovation and acquisition became "mandatory, a life-and-death matter for the firm" (Baumol, 2002, p. 1). In competitive struggles to do more with less, corporations constantly upgraded, modified, or enhanced their forces of production with new technology—all kinds of labour-

saving machines designed to reduce worker skills or replace workers all together (Rifkin, 1995). While corporations invested their profits in and applied new technology to the production process to enhance their competitive position vis-à-vis market rivals, increase efficiencies and maximize profits, the casualties of this process were workers, who found themselves deskilled or unemployed as result of the corporation's choice to acquire and apply the new innovation to the labor process (Aronowitz and Difazio, 2010). *Deskilling by technology* refers to when a company reduces the skill-set required by workers to complete a task with technology that can be easily operated by semiskilled or unskilled workers. *Unemployment by technology* refers to when a company removes the worker from the production process by replacing their skill-set with a machine. By deskilling or replacing workers with new technology, managers aim to exert control over the production process, reduce costs associated with waged labor and maximize their firm's profits (Brynjolfsson and McAfee, 2011; Krugman, 2012). According to Nobel (1995), new technology often empowers owners and Taylorist-minded managers, disempowers waged workers and upholds a societal model of "progress without people." By the late 20th century, the principles of Taylorism became "the bedrock of all work design" (Braverman, 1974, p. 87), permeating managerial discourse and practice in all sectors of the U.S. economy and affecting the lives of industrial workers, as well as post-industrial knowledge workers. In the 21st century, and while there have been many instances of worker resistance to Taylorism, there now exists a "generalised or social Taylorism" (Robins and Webster, 1999) that informs management strategies in factories, service and retail sectors, culture industries and even colleges and universities (Kliebard, 1986; Stewart, 2009). With this in mind, the next section places the MOOC on a historical continuum of managerial attempts to Taylorize education with new communication technology.

Historicizing the MOOC: Taylorizing Academia/Managing with "Efficient" Education Technology

Over the past two years, the MOOC has been represented as a "new" technology that is radically transforming higher education. This notion that the MOOC is "new" and the narrow news media focus on "what's going on now" at the expense of a broad historical account of "what came before" is a major cognitive problem that is typical of "present-minded" capitalist societies (Jameson, 1991). In confronting this issue, we wish to consider the dialectic of continuity and change surrounding current attempts to transform educational institutions with new MOOCs. Are MOOCs as radically "new" as some say they are and if not, what are their technological antecedents? Did communication technologies thought to be "new" in previous epochs radically disrupt existing models of college and university education? These questions encourage us to place the buzz surrounding the MOOC on a continuum of historical attempts to transform education with perceptibly "new" communication technologies. In this section, we argue that the MOOC's arrival on the 21st century scene extends a long history of Taylorist attempts to apply new communication technology to the academic labor process as a way of making course delivery more efficient.

In the U.S., firms, government agencies and educational reformers have long striven to Taylorize the labor process of higher education (i.e. the work of teaching) by standardizing curriculums, establishing best teaching practices, weakening teachers unions and developing "practical techniques that might yield new 'efficiencies' in the delivery of instruction"(Gude, 2013; Kliebard, 1986; Lagemann, 2000, 73; Giroux, 2007). Cuban (1986, p. 86) says, "Converting teaching into a science historically has driven many reformers, researchers, and policy-makers toward embracing numerous innovations that have promised precision harnessed to efficiency". From the late 19th to late 20th century, various communications technologies—the postal system, the motion picture, radio, TV, the computer and the Internet—were used by university managers as a way to make education more efficient. While some university administrators hoped these new tools would

improve the quality of education and meet student needs, many saw in these new mediums a labor-saving device that would enable universities to teach more students with fewer professors and eventually, supplant professors (Cuban, 1986). As King (1999, p. 18) says, "most uses of technology [in education] are devoted to automating instruction rather than innovating instruction".

In the late 19th century, U.S. educational reformers sought to make higher education accessible to all. They proposed to do so by offering courses to students who could not attend campus by sending educational materials to them through the postal system. Throughout the 20th century, this education by correspondence grew: universities and colleges developed the capacity to deliver course materials through various communications media and grant credits, diplomas and degrees to students who successfully completed courses. Many proponents of correspondence and distance education in the U.S. held a Taylorist view. "[T]he application of technology" to distance education was "tied to ideas of efficient utilization of teaching resources, the mass-production of educational material and attempts to organize education in labor saving ways" (Lee 2009, p. 151).

In the early 20th century, schools employed the new medium of the motion picture to increase organizational efficiencies. In 1922, Thomas Edison said "the motion picture is destined to revolutionize our educational system and [. . .] in a few years it will supplant largely, if not entirely, the use of textbooks. [. . .] The education of the future, as I see it, will be conducted through the medium of the motion picture [. . .] where it should be possible to achieve one hundred percent efficiency" (cited in Cuban, 1986, p. 9). Teaching by motion picture allowed schools to instruct larger groups of students with fewer teachers and also to standardize the knowledge conveyed through lectures (King 1999, p. 3; Pattison, 2006; Throndike, 1912).

Between WWI and WWII (1918-1946), radio was used as an educational labor-saving technology and this new radio-teaching

aimed to minimize an institution's need for teachers. Once an educational broadcast was recorded, it could then be played and replayed over and over again for multiple students. Cook (1938) observed how radio teaching "mechanizes education and leaves the local teacher only the tasks of preparing for the broadcast and keeping order in the classroom" (249-50). Journalist Bruce Bliven wondered: "Is radio to become a chief arm of education? Will the classroom be abolished, and the child of the future be stuffed with facts as he sits at home or even as he walks about the streets with his portable receiving-set in his pocket?"(cited in Matt and Fernandez, 2013).

In the 1950s, the Harvard University professor and business engineer B. F. Skinner observed that more people than ever before wanted an education, but said that this growing "demand cannot be met simply by building more schools and training more teachers". Instead, Skinner said "Education must become more efficient" and could be made to be so by inventing new "labor saving capital equipment"(cited in Lee, 2009), or what he called, "teaching machines". Skinner designed the Didak, Pressey's punchboard, slider and disc machine to teach students without teachers. Intrigued by the labor-saving efficacy of Skinner's teaching machines, Fry (1958, p. 31) said "small schools with limited curriculum offerings can offer a wider variety of subjects [. . .] by having a machine-laboratory where one teacher can supervise different pupils learning different subjects".

One of the most popular "teaching machines" of the 1950s was TV. In 1958, there were 150 closed circuit TV installations in U.S. schools and universities and 31 educational TV stations broadcasting educational content through the airwaves to students enrolled in college and university courses (Zorbaugh, 1958, p. 337). Facing a shortage of university teachers, classrooms and public funds, U.S. educational efficiency experts promoted TV's wide adoption at "all levels" of the U.S. educational system as a "rational response" to these problems (Eurich, 1958, p. 330). "Teaching by television"—broadcasting live or pre-recorded TV shows to many

students in many places as a supplement to or substitution for live lectures by professors—was seen as an "efficient method to solve critical educational problems"(Eurich, 1958, p. 330). In 1958, Stephens College offered a course instructed by one "outstanding teacher" over closed-circuit television to numerous classrooms at the same time, enabling it to teach more students with less professors than were hitherto required. In that same year, San Francisco State College broadcast lectures made by its own TV studio from its own TV station into the homes of its students, allowing it to reach more students with fewer teachers. At Pennsylvania State University, 24,700 students in 84 courses were instructed via TV (Zorbaugh, 1958, p. 337). In addition to bringing the nation's "greatest teachers to more students through television", TV-teaching was trumpeted as allowing schools to increase the number of students enrolled in courses and offer courses "at lower costs than regular classroom instruction (Eurich, 1958, p. 334). Paul Martin, the president of California's Compton College, said TV teaching was a cost savings measure: TV allowed his school to "double enrollment without hiring a single new teacher" (Casty, 1960, p. 473). Though administrators and TV companies promoted TV teaching, professors saw in TV "the threat of technological unemployment, the degradation of the teacher's status and role, and the dehumanizing of the teacher-pupil relationship" (Zorbaugh, 1958, p. 342).

Throughout the 60s, 70s and 80s, U.S. colleges and universities applied old and new communication hardware and software to the educational process with the goal of increasing efficiency. Yet, by the early 1980s, the U.S. education system still exhibited the same old problems that old new technology was imagined to be capable of solving: budgetary challenges, underperforming and disengaged students, and professorial autonomy. A recent review by Hill (2012) points to a number of attacks on academic autonomy, and the "automation" of the profession, including notions of "quality control," the rise of managerial attempts to control "standards," excessive workloads, "performance" appraisal, commercialization of knowledge, and reductions in research time.

A review of scholarly literature on the impact of communication technology and new media on education concluded that "five decades of research suggest that there are no learning benefits to be gained from employing different media in instruction, regardless of their obviously attractive features or advertised superiority"(Clark, 1983, p. 450). Although each new medium attracted "its own advocates who made claims for improved learning," most made no significant difference to the overall quality of education (Clark, 1983, p. 447). Instead of contemplating why technology failed to improve education or was mistaken as an appropriate solution to its problems in the first place, many educational policy-makers and university administrators got caught up in the U.S. computer revolution, which, throughout the 1980s and 1990s, offered them new hopes for educational efficiency. As Cuban (1993, p. 187) observed, "school reformers [. . .] have turned increasingly to computers in schools as a solution for inefficient teaching". Reformers argued that computers would revolutionize education, improve teaching and learning, provide wider access to students that lived at a distance from campuses, prepare students for work as laborers in the U.S's growing knowledge and information economy, reduce costs associated with professors and physical classroom space, attract Silicon Valley partnerships to schools operating on shoe-string budgets, create a de-centralized and global network of teachers and students and move away from a "sage on the stage" model of instruction to student-led and student-centered interactive classrooms (Oppenheimer, 1997). By the end of the millennium, the educational promise of computers and Internet-supported course delivery and learning outcomes was quite far from being realized. In a study of computers in the classroom, Cuban (2003, 179) said "computers have been oversold [by policy-makers, tech corporations and their marketers, and educational reformers] and underused" for educational purposes. Even though more students had access to computers, the notion that education underwent a change for the better was hard to support.

In the 1980s and 1990s, computer-mediated education and online course delivery did, however, support Taylorist managerial strategies and drew academia more completely "into the age of automation" (Noble, 1998, p. 1). This occurred in tandem with the neoliberal re-designing of universities to function as contributors to capital accumulation, a role typified by the consolidation of public-private partnerships, the commercialization and transfer of publicly funded knowledge to firms as patents and copyrights, a growing divide between high-salaried university administrators and low salaried and precarious temp-profs and accelerated administrative attempts to deskill teachers and automate their work (Noble, 1998, 2001; Giroux, 2007). New e-learning initiatives reflected the Taylorist goal of using new technology to "discipline, de-skill and displace [professorial] labor" (Noble, 1998, p. 5). They gave administrators greater control over faculty performance and course content, extended the time and space of teaching from the classroom to the professor's home and transferred the professor's pedagogical skill to a CD-ROM, DVD video or website whose copyright was owned by the university. Noble (1998, p. 6) said "the new technology of education, like the automation of other industries, robs faculty of their knowledge and skills, their control over their working lives, the product of their labor, and ultimately, the means of their livelihood".

This brief look at 20th century efforts to apply new communication technology to the education process in hopes of making it more efficient suggests a pattern: communication technology is developed and promoted by its makers, educational reformers, politicians and university administrators as a solution to one or more of the many so-called efficiency problems faced by universities; the technology is adopted and implemented by universities and colleges, but fails to bring about the efficiencies desired by its advocates; the new technology is criticized for failing to live up to its promises, but soon after, a newer communication technology emerges and is again celebrated by corporations, policy-makers and university administrators as bringing about a major change to education (Cuban, 1986). In response to attempts

by university administrators to get them to adopt new technology, professors express fears that these new machines will deskill them or take their jobs and then fight back. Hence, distance education, radio, motion pictures, TV and the computer and e-learning initiatives may not have completely deskilled or eliminated the need for professors. Face-to-face interaction between professor and student in physical classrooms still happens and many students prefer actual to virtual learning experiences. So, while educational technology is often designed by corporations and taken up by university administrators to better control the academic labor process, it often fails to do so.

In sum, the 20th century is full of technological promises by corporations (which have an interest in selling efficient educational hardware and software to universities) and the university administrators (who have an interest in acquiring new technology to reduce costs) to make education better and more accessible for students (who have an interest in a meaningful educational experience). While corporations have profit-maximized by selling technological solutions to universities and new universities have built brand images upon the promise of new technology (i.e. the University of Phoenix and the University of Athabasca), it is not apparent that the quality of education has improved. Due to a decrease in funding for public education over the past few decades, class sizes have grown and the cost of tuition has increased (Carlson and Blumenstyk, 2012). Furthermore, as Giroux (2007, p. 123) points out, the rise of online education "fuels the use of part-time faculty who will be perfectly suited to the investor-imagined university of the future". In Canada, for instance, the use of part time teachers rose from 8.7% in 1999 to 17.5% in 2005 (Lin, 2014.). One of the reasons for this trend is that part-time labour is cheaper than tenured, full-time labour, because wages are less, benefits are minimal or non-existent, most work of this nature is contractual, and, with the addition of on-line delivery methods, courses can be packaged and resold to students with minimal involvement of professors, whether tenured or not.

The Functions of MOOCs Today

With respect to the aforementioned history, there is almost nothing new about the utility of the MOOC to university managers. The MOOC is the latest attempt to breathe life into technology's ever-failing promise to make higher education more efficient and represents the continuation of longstanding attempts by corporations, education reformers and university administrators to apply technology to the educational labor process as a way of cutting costs. In the mid-1960s, neoliberal economists William J. Baumol and William G. Bowen spoke of a "cost disease" in higher education; the wages of professors were rising with inflation but without comparable increases in productivity. In 2012, Bowen argued that online education could cure this cost disease by reducing the number of professors needed to teach courses and thereby decreasing the amount of money a university needed to spend on wages (Heller, 2013). The administrative attempt to reduce labor costs in a period in which many universities cannot afford to educate their students in actual classrooms or hire a sufficient number of actual full-time professors to teach students is driving the buzz around MOOCs. MOOCs represent a technological "fix" to the problem of under-funded education because they support the strategic goals of cash-strapped university administrators to reduce costs associated with space and professorial labor. The American Council on Education President Molly Corbett Broad says MOOCs are "right at the intersection of high quality and lower cost" (cited in Rivard, 2013). Technology guru Clay Shirky (2013) spells out the economic rationale for management's MOOC infatuation: "Institutions that don't keep expenses below revenues eventually collapse." MOOCs are not "much of a leap in pedagogy" says Shirky (2013), but are likely "attractive to universities because of their accessibility, flexibility and cost—not quality." MOOCs are being promoted to universities as a means to reduce labor costs and are giving politicians an excuse to slash public funding to already underfunded public universities (Parry, 2013).

If implemented, MOOCs would allow universities to teach more students with fewer professors. In a publicity video, Udacity's Thrun (2012), for example, implies that Stanford University's employment of one professor to teach multiple sections of the same course is inefficient: "At Stanford, there is a very popular professor who teaches more students in his class than fit in the largest auditorium. So he teaches the same class twice in the same week, the exact same lecture, twice. Then year in and year out, he is going to teach the same class essentially again and again". MOOCs, however, enable that same Stanford professor to reach vast numbers of students without having to teach them in face-to-face classrooms. "In terms of teachers, I think there is going to be, I think there will be adjustments to be made" says Thrun (2012). "We will make the education, by and large, more economical and better. So the hope, the fact that things are more economical and better will lift up everybody" he says. In an interview with Bloomberg, Thrun (2014) describes his Udacity as delivering education at ten percent of the cost of existing U.S. colleges: "We can do education much better, much more effectively and much more engaging at a lower price point. That is absolutely do-able. Our business model is such that we can keep a surplus from our classes." Coursera's Ng (2013) also explains how MOOCs make education delivery more efficient in a publicity speech to the Silicon Valley Bank's CEO Summit: "As a Stanford professor, I normally teach a four hundred student Stanford class. A year and a half ago, I put my class online and it reached an audience of eight hundred thousand students. To put that number in context, for a professor like me to reach eight hundred thousand students, if you do the math, I would otherwise have had to teach at Stanford, for, you know, two hundred and fifty years." Delbanco (2013) sums up the efficiency of the MOOC, saying it will enable universities to "increase productivity by allowing a smaller number of teachers to produce a larger number of learning outcomes (today's term for educated students) than ever before". In this context, efficiency refers to a university's capacity to process more students with fewer workers. In addition, missing from the "educating more students" conversation is the reality that if it costs approximately $500 in tuition per student per course, a

course of 400 students would generate approximately $200,000 in revenue. Even if students were charged $50 per course to participate in a MOOC with 100,000 students, the net revenue would be in the order of five million dollars. It is thus not surprising that MOOCs are attractive to cash strapped university administrations.

Just as Taylor aimed to determine the one best way to do a job and then enforce this standard upon the labor process of workers factories, the for-profit MOOC company encourages the professor to work out the one best way to teach a course, standardize this one way as a set of reproducible videos and then impose this course standard upon all the students that enroll to take it. By developing a MOOC course, the professors essentially contribute to their own deskilling and obsolescence. When making a MOOC, the professor transfers their skill to a video which can then be watched, over and over again, by anyone who possesses the means to do so. Although this relieves the professor of the work of preparing and delivering lectures many times each week to students, it also diminishes the value of the skill required to do so. The MOOC transfers the professor's skill as a lecture designer to a video, which then becomes a substitute for the day-to-day work of preparing and delivering lectures. Once a MOOC video is recorded, it can be re-used and replayed, much like a TV show or film. The MOOC video, the product of the professor's labor, is then separated from the professor and stored as a digital file in the MOOC company's archive of reproducible lectures. In addition to deskilling professors by transferring the skill of lecture creation to video, the MOOC deskills professors by divorcing the delivery of the lecture from the professor and shifting this important skill to the MOOC company and its Web-based exhibition platform. The effect of the MOOC is to instigate the automation of the labor of teaching. Once created, the MOOC becomes a substitute for the unique professor and a replacement for the distinct course they once taught and lecture they delivered; it thereby potentially eliminates the university's need for as many professors. By standardizing the lecture in video form, eliminating the skill of conceptualizing and delivering lectures, and

acting as an automated substitute for the professor, the MOOC enables university managers and MOOC companies to exert control over the educational process, from course conception to delivery. In the hands of university administrators, MOOCs serve to make education more efficient by standardizing the academic labor process, deskilling teachers and ultimately, functioning as an automated substitute for flesh and blood professors.

In addition to helping university managers reduce the cost of professorial labor, MOOCs also help them reduce the costs associated with the evaluation of undergraduate students. Traditionally, student course work (tests and written assignments) has been evaluated by professors and graduate students. The MOOC aims to reduce or eliminate the cost of evaluation by transferring the skill required to do so to automated grading systems. MOOC courses can enroll hundreds, even hundreds of thousands of students at the same time, but universities do not want to pay hundreds of graduate teaching assistants to evaluate the course work produced by these students. Instead, they are relying on MOOCs, which are designed to support the growing phenomena of automated grading systems for evaluating student exams, and even essays (Anderson, 2012; Heller, 2013; Lewin, 2012; Rivard, 2013). The automation of grading contributes to the further standardization of the educational labor process and relieves universities of having to pay people to evaluate and assess student performance. The MOOC is also designed to facilitate massive peer-to-peer evaluation processes (Degree of Freedom, 2013). Instead of having paid professors and teaching assistants to evaluate student tests and essays, MOOCs are designed to outsource this work to students, who grade without pay. The peer-to-peer evaluation process supported by MOOCs reflects the business strategy of "crowdsourcing". Howe (2006) argues that the most powerful Web and Internet companies are "designed to take advantage of the networked world" and with "distributed labor networks are using the Internet to exploit the spare processing power of millions of human brains." In the global market, U.S. based companies regularly outsource work to lower paid workers in

other countries; in a global virtual market, Internet companies outsource tasks to networked crowds of Web users. The labor "costs a lot less than paying traditional employees" says Howe (2006). "It's not outsourcing; its 'crowdsourcing'". MOOC-integrating universities are emulating the Web business strategy of crowdsourcing by downloading work hitherto done by paid academic workers to unpaid students, who grade themselves. "We desperately need crowdsourcing" says Cathy N. Davidson, a Duke University English professor. "We need MOOCE—massive online course evaluation" (Pappano, 2012). This need is being capitalized on by MOOC crowd-grading software which helps university administrators cut grading costs and eliminate the need to pay evaluators.

Clearly, the MOOC is not a value-neutral tool, but is designed to take sides in class conflicts between university administrators (who aim to downsize the academic workforce and cut professorial labor costs) and professors (who wish to keep their jobs and maintain salaries). The MOOC supports the efficiency goals of university administrators and helps them to deskill, automate and crowdsource academic work. The MOOC not only threatens the livelihood of existing professors, but also, poses a threat to the PhD students who are training to become professors. The North American university system is cultivating far more PhDs than it is creating sessional, adjunct and full-time professor jobs. As result, many PhD holders end up working in non-academic jobs. The MOOC worsens the ever-worsening conditions of academic under or unemployment among PhD students and recent graduates. The more preoccupied a university becomes with MOOCs, the fewer courses there are available for people to teach; the fewer the courses a university requires to be taught, the fewer the number of adjunct or full-time professor jobs a university will create. MOOCs, therefore, threaten existing academic jobs and those that PhD students hope will be created.

Conclusion: Democratize MOOCs/Democratize Society

Throughout this article, we have argued that MOOCs, like previous efficient communication technologies peddled by for-profit companies to universities as a solution to their budgetary problems, are being designed for implementation by Taylorist-minded university managers to make education more "efficient". That being said, there is no guarantee that the for-profit U.S. MOOC platform will gain the momentum or have the widespread effects we fear. Indeed, Sebastian Thrun, widely considered one of the "godfathers" of MOOCs and founder of Udacity, has recently stated that their product is "lousy" at educating people (Schuman, 2013). Furthermore, the use of the MOOC to deskill teachers and automate education worldwide is not inevitable. This is because the meaning, design and use of the MOOC are being fought over by a variety of interested actors: corporations, educational policy-makers, university administrators, professors, students and more. The MOOC is best conceptualized, not as a closed technology whose meanings, uses and effects are fixed, but rather, as a negotiable technology whose future is without guarantees. The future of education will not be determined by the new MOOC technology, but by the choices policy-makers, administrators, educators and students make, in the present, about what to do with it.

With this in mind, we advise all university administrators to slow down and proceed with caution (Alvi, 2011) before allocating time, money, infrastructure, knowledge, faculty members and students to a MOOC fixated university. More importantly, we call for the democratization of MOOC policy. The initiative to implement MOOCs in the university is largely being driven by neoliberal educational reformers, government policy-makers, MOOC corporations and some professors. Though professors and students are frequently spoken of by MOOC enthusiasts as the beneficiaries of this new tool, they are by and large not the ones in control of the choice to acquire, implement and use it. The essence of democracy is the ability of citizens to influence and make the decisions that affect the conditions of their lives. But the decision-

making process that is bringing MOOCs into the university excludes most professors and students and is deeply undemocratic. Going forward, we need to have a serious discussion about our collective ends as educators before embracing every new means that becomes available for us to teach with.

We hope that our analysis of the MOOC will be of interest to all educators, students and social justice activists concerned about the present and future of educational policy, the institutions of higher education, the relationship between teachers and students, and the broader role of new technology in education. We also hope that educators inside and outside of the U.S. take our critique seriously, because MOOCs are in the process of being adopted by universities all over the world (Bradshaw, 2012). The slow diffusion and adoption of MOOCs means that university administrators, professors, students and citizens still have time to critically reflect upon the advantages and disadvantages of MOOCs and deliberate about whether or not their educational future should reflect the MOOC fixated one largely being imagined by technology firms and neoliberal politicians around the higher educational world. Citizens, not corporate and governmental elites, must be the ones who choose to accept or reject MOOCs and they should exercise this choice through inclusive, meaningful and effective public deliberation about MOOCs in their classrooms, and in their society.

References

Alvi, S. (2011). Proceed with caution: technology fetishism and the millennial generation. *Interactive Technology and Smart Education*, 8(2): 135-144.

Aronowitz, S. and Difazio, W. (2010). *The Jobless Future*. Minnesota: University Of Minnesota Press.

Barney, D. (2007). *One Nation Under Google: Citizenship in the Technological Republic*. Toronto: The Hart House Lecture.

Baumol, W. (2002). *The free-market innovation machine: Analysing the growth miracle of capitalism.* Princeton University Press.

Braverman, H. (1974). *Labour and Monopoly Capital: The Degradation of Work in the Twentieth Century*. New York: Monthly Review.

Brynjolfsson, E. and McAfee, A. (2011). *Race Against The Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*. New York: Digital Frontier Press.

Carlson, S. and Blumenstyk, G. (2012, Dec. 17). For Whom is College Being Reinvented? *The Chronicle of Higher Education*. Retrieved from http://chronicle.com/article/The-False-Promise-of-the/136305/

Casty, A. (1960). Automation in the Classroom. *College English*, 21(8): 472-475.

Clark, R. (1983). Reconsidering Research on Learning from Media. *Review of Educational Research*, 53(4): 445-459.

Cook, L. A. (1938). *Community Backgrounds of Education: A Textbook and Educational Sociology.*

Cuban, L. (1986). *Teachers and Machines: The Classroom of Technology Since 1920*. New York: Teacher's College Press.

Cuban, L. (1993). Computers Meet Classroom: Classroom Wins. *Teachers College Record*, 95(2): 185-210.

Cuban, L. (2003). *Oversold & Underused: Computers in the Classroom*. Harvard University Press.

Degree of Freedom. (2013, March 22). MOOC Components – Assessment. Retrieved from http://degreeoffreedom.org /mooc-components-assessment/

Delbanco, A. (2013, March 31). MOOCs of Hazard. *New Republic*. http://www.newrepublic.com/article/112731/moocs-will -online-education-ruin-university-experience

Dyer-Witheford, N. (1999). *Cyber-Marx: Cycles and Circuits of Struggle in High-Technology Capitalism*. Illinois: University of Illinois.

Eurich, A. C. (1958). A Foundation Looks at College Teaching by Television. *Journal of Educational Sociology*, 31(9): 329-336.

Freeman, F. N. (1924). *Visual Education*. Chicago: University of Chicago.

Friedman, T. L. (2013, March 15). The Professor's Big Stage. The New York Times. Retrieved from http://www.nytimes.com /2013/03/06/opinion/friedman-the-professors-big-stage.html

Fry, E. (1959). Teaching Machines: The Coming Automation. *The Phi Delta Kappan*, 41(1): 28-31.

Giroux, H. A. (2007). *The university in chains: Confronting the military-industrial-academic complex*. Paradigm Publishers.

Gude, S. (2013). The Industrial Classroom. *Jacobin/a magazine of culture and polemic*, 10 (April). http://jacobinmag.com/2013/04/the-industrial-classroom/

Heller, N. (2013, May 20). Laptop U: Has the future of college moved online? The New Yorker. http://www.newyorker.com /reporting/2013/05/20/130520fa_fact_heller

Hill, R. (2012). *Whackademia: An insider's account of the troubled university*. NewSouth.

Howe, J. (2006). The rise of crowdsourcing. Retrieved from http://www.wired.com/wired/archive/14.06/crowds.html

King, K. P. 1999. "One Hundred Percent Efficiency": The Use of Technology in Science Education Since 1900. *Journal of the Association for History and Computing*, 2(2): 1-24.

Kliebard, H. M. (1986). *The Struggle for the American Curriculum*, 1983-1958. Boston: Routledge & Kegan Paul.

Krugman, P. (2012, Dec. 12). Robots and robber barons. http://www.nytimes.com/2012/12/10/opinion/krugman-robots -and-robber-barons.html?_r=0

Lagemann, E. C. (2000). *An Elusive Science: The Troubling History of Education Research.* Chicago: University of Chicago Press.

Lee, F. (2009). *Letters & Bytes: Sociotechnical Studies of Distance Education.* Linkoping: Linkoping University

Lewin, T. (2012, March 4). Instruction for Masses Knocks Down Campus Walls. Retrieved from http://www.nytimes.com /2012/03/05/education/moocs-large-courses-open-to-all -topple-campus-walls.html?pagewanted=all

Lin, J. (2014 January 3.). *The teaching profession: Trends from 1999 to 2005.* Retrieved http://www.statcan.gc.ca /pub/81-004-x/2006004/9540-eng.htm#table5

Marx, K. (1983). *Capital Volume 1*. Moscow: Progress Publishers.

Matt, S. and Fernandez, L. (2013, April 23). Before MOOCs, 'Colleges of the Air'. *The Chronicle of Higher Education.* Retrieved http://chronicle.com/blogs/conversation /2013/04/23/before-moocs-colleges-of-the -air/?cid=at&utm_source=at&utm_medium=en

Ng, A. (2013, April 19). SVB CEO Summit 2013: Andrew Ng, Coursera. Retrieved from:https://www.youtube.com /watch?v=PcOqMnv7qSI&index=3&list=PLZnAgn N9WUbUbHTm4T85cydk7zW3Dkeg4

Noble, D. (1977). *America by Design: Science, Technology, and the Rise of Corporate Capitalism*. New York: Knopf.

Noble, D. (1979). Social Choice in Machine Design: The Case of Automatically Controlled Machine Tools. In A. Zimablist (Ed.), *Case Studies in the Labor Process*. New York: Monthly Review.

Noble, D. (1984). *Forces of Production: A Social History of Industrial Automation*. New York: Knopf.

Noble, D. (1995). *Progress Without People: New Technology, Unemployment, and the Message of Resistance*. Toronto: Between the Lines.

Noble, D. (1998). Digital Diploma Mills: The Automation of Higher Education. *First Monday: Peer-Reviewed Journal on the Internet*, 3(1-5).

Noble, D. (2001). *Digital Diploma Mills: The Automation of Higher Education*. New York: Monthly Review Press.

Oppenheimer, T. (1997). The Computer Delusion. *The Atlantic Monthly*, 280(10): 45-62.

Pappano, L. (2012, Nov. 12). The Year of the MOOC. Retrieved from http://www.nytimes.com/2012/11/04 /education/edlife/massive-open-online-courses-are -multiplying-at-a-rapid-pace.html?pagewanted=all&_r=0

Parry, M. (2013, September 3). A Star MOOC Professor Defects —at Least for Now. The Chronicle of Higher Education. Retrieved from http://chronicle.com/article/A-MOOC-Star -Defects-at-Least/141331/

Pattison, L. 2006. Taking the Movies to School: Science, Efficiency, and the Motion Picture Project, 1929-1939. *History of Intellectual Culture*, 6(1): 1-15.

Postman, N. (1998). Five Things We Need to Know about Technological Change. Retrieved from https://www.student.cs.uwaterloo.ca/~cs492/papers/neil -postman--five-things.html

Pressey, L. (1927). A machine for automatic teaching of drill material. *School and Society*, 25: 549-552.

Rifkin, J. (1995). *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era*. New York: Putnam Publishing.

Rivard, R. (2013, April 19). EdX Rejected. Retrieved from http://www.insidehighered.com/news/2013/04/19/despite -courtship-amherst-decides-shy-away-star-mooc-provider

Rivard, R. (2013 July 11). Blackboard, the largest provider of classroom management software, enters the MOOC fray. Inside Higher Ed. Retrieved from http://www.insidehighered

.com/news/2013/07/11/blackboard-largest-provider
-classroom-management-software-enters-mooc-fray

Robins, K. and Webster, F. (1999). *Times of the Technoculture: From the information society to the virtual life.* New York: Routledge.

Schuman, R. (2013, Nov. 19). The King of MOOCs Adbidcates the Throne. Retrieved from: http://www.slate.com/articles/life/education/2013/11/sebastian _thrun_and_udacity_distance_learning_is_unsuccessful_for_ most_students.html

Shirky, C. (2013, July 8). MOOCs and Economic Reality. The Chronicle of Higher Education. Retrieved from http://chronicle.com/blogs/conversation/2013/07/08/moocs -and-economic-reality/

Skinner, B. F. (1958). Teaching Machines*. Science* 3330.

Stevens, C. (2012, August 8). Reschooling Society. Retrieved from http://www.youtube.com/watch?v=kp7DKzTxFSw

Stewart, M. (2009). *The Management Myth: Why the Experts Keep Getting it Wrong.* New York: W. W. Norton & Company

Throndike, E. L. (1912). *Education.* New York: Macmillan.

Thrun, S. (2014, March 15). Thrun: Self-Driving Cars to Changing Education. Retrieved from: https://www.youtube.com/watch?v=2kQUaGMudlA

Thrun, S. (2012, Aug 8). Online Education, Udacity, MOOC, Open Ed. Retrieved from: https://www.youtube.com/watch?v=kp7DKzTxFSw

Wasko, J., Murdock, G., and Sousa, H. 2011. Introduction: The Political Economy of Communications–Core Concerns and Issues. In *The Handbook of Political Economy of Communications*, ed. J. Wasko, G. Murdock and H. Sousa, 1-10. Blackwell Publishing.

Webster, F. and Robins, K. (1986). *Information Technology: A Luddite Analysis.* Norwood: Ablex.

Zorbaugh, H. (1958). Television-Technological Revolution in Education. *Journal of Educational Sociology*, 31(9): 337-345.

Author Details

Tanner Mirrlees is an Assistant Professor of Communication at the University of Ontario Institute of Technology (UOIT). Correspondence email: tanner.mirrlees@uoit.ca

Shahid Alvi is Professor of Criminology at the University of Ontario Institute of Technology (UOIT). He is the author or co-author of

numerous articles, book chapters, and five books, including *Youth Criminal Justice Policy in Canada: A Critical Perspective (*Springer Press)*, Under Siege: Poverty and Crime in a Public Housing Community* (Lexington Press), and *Deviance and Crime: Theory, Research and Policy* (Lexis/Nexis). Correspondence email: shahid.alvi@uoit.ca