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online education, adjunctification, and the disciplining of academic labour

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#### ABSTRACT

There has been little analysis of how neoliberal adjunctification and online education (OLE) are shaping a new academic division of labour in US colleges and universities. OLE rationalises academic labour by separating it from the delivery of educational content while transforming learning into the selfdisciplined completion of sequential tasks (e.g. 'competency-based learning') under the panoptic surveillance of online course management systems (CMS). OLE is subtly shifting the very hidden curriculum of higher education to meet the needs of global capital for a more effectively disciplined labour force that can work contingently and remotely with little or no overt coercion. This analysis of the process by which OLE is rationalising academic labour draws upon the ideas of Foucault and Tronti to argue that OLE is a tool for producing a type of disciplined labour that breaks down the borders between productive and reproductive labour in order to colonise all life as work.

## Introduction

The hidden curriculum of higher education that teaches students to recognise and submit to the authority of the existing order and the centrality of work is being transformed almost imperceptibly.<sup>1</sup> Online education (OLE) augments the traditional hidden curriculum by socialising the student (the present unwaged and future waged worker) to work while being subjected to omnipresent remote monitoring, without ever knowing if they are being watched. The growth of OLE reflects the needs of capital for flexible 'just in time' workers who are always available to work and self-disciplined to work remotely without direct oversight while monitored by computer technology. The

<sup>1</sup> By hidden curriculum, I mean how education carries out the process of socialising students to adhere to the latent norms, values, and relationships of power in society.

disciplining of adjunct professors and student labour power are at the centre of OLE. From my own personal experience (having taught political science online for a community college) and my research into OLE, I find that OLE is not merely changing learning and instruction but also serves to discipline labour in a new division of academic labour.

OLE disciplines the labour power of present and future waged workers: to take direction without being given it; to work without apparent, visible authority; to identify rules by which to endlessly replicate patterns; and always be prepared to work even when not being paid for it. OLE exists not only to serve the changing composition of capital but also to universalise it in the service of accumulation. OLE did not merely emerge as a new clever use of existing computing power to remotely deliver education but in conjunction with the changing division of labour throughout the 'social factory' (Tronti, 1962; 1973). The dismantling of the Fordist social wage (Caffentzis, 1975, 2010) threatens to leave a restless, dissatisfied, and insurgent workforce, what Michel Foucault called an 'unusable and dangerous coagulation' located in a key sector of the economy producing labour power for the high tech sector (Foucault, 1995:143). This coagulation can be seen on the campuses of higher education as more and more students enter the colleges and universities, making demands for more resources, relevant and meaningful areas of study, and continued democratic control. This is occurring even as higher education is being reorganised by the key elements of neoliberalism, austerity, automation, entrepreneurialisation, and outsourcing, to make student labour power more useful to capital (Caffentzis, 1975, 2010; Ovetz, 1996a, 1996b).

In response, neoliberals have proposed the introduction of adjunctification, automation, and breaking the remaining power of the faculty over instruction under the guise of 'reform', promoting 'student access', 'efficiency', 'equity', 'unbundling', and 'innovation'. The neoliberal strategy is to advance OLE to produce workers who are disciplined to work contingently in a labour force increasingly characterised by such contingent work, the outgrowth of 40 years of 'just in time' production and distribution which considers workers' 'disembodied skills' as just one of the interchangeable 'inventory items in organisational planning' (Noble, 2002).

Foucault's analysis underlines the importance of understanding the transformation of the division of academic labour as a response to class struggle. The new division of academic labour is intended to better serve capital's needs for submissive workers working in conditions of ubiquitous surveillance as part of a strategy to impede a recomposition of working class power. While awareness of big data's role in mass surveillance in the endless War on Terrorism has grown, its role in the disciplining of labour power has been overlooked. Such an analysis would help identify potential points of rupture in capital's plan (Ovetz, 2015b).

## Logging in: neoliberalism and the rise of OLE

The rapid expansion of OLE, in which college and university courses are moved from the classroom to distance education as online courses primarily taught by adjunct professors, has been thoroughly documented (Noble, 2001, 2002; Ovetz, 2015a, 2015b, 2015c). The first major all-online system was established by the Department of Defense in 2000 in partnership with the budding industry. Today, such systems range from

private for profits to nearly entirely online public community colleges (Rio Salado College in the Maricopa Community College system of Arizona), state systems (Arizona State University Online, Colorado Community Colleges' CCCOnline, and California Online Virtual Campus), or multi-state systems (Western Governors University). There has been little push back against the ubiquitous spread of online public higher education in the USA. In California's community colleges alone, where about 1.5 million students are enrolled per semester, 25% of all community college students have taken an online class, an increase from 12.5% between 2005 and 2015. It is estimated that 12.3% of all classes are completely online and half are partly online.<sup>2</sup>

The impact of neoliberalism on higher education is finally receiving increasing attention. Neoliberalism is the strategy of expanding the power of the state to facilitate the flow of capital while constricting the state when delivering services that serve human needs (Sachs, 1989; Williamson, 1993). Neoliberalism is introducing a new system of management that subjects and subordinates higher education to the dictates of market capitalism (Schapper & Mayson, 2005; Ward 2012). Over the past few decades, the state colleges and universities have emulated the for-profit universities by becoming employers of contingent academic labour and automating and outsourcing core functions (Rhoades, 1996; Noble, 2001; Slaughter & Rhoades, 2004:21–2).

Both austerity and neoliberalism have contributed to the push to deliver disciplined academic labour at the lowest cost possible with the greatest increase in productive output. This strategy emerged in response to the growing number of students demanding free and open access to colleges and universities, the transformation of the curriculum to serve their needs, and democratic shared governance of their institutions (Ovetz, 2015a; 2015b; 2015c). The response has been to impose austerity by reducing tax revenue per student, shift the costs from society to the user, and replaced the majority of faculty staff with contingent, part-time adjunct professors. The neoliberal restructuring of higher education has reshaped campus administration, programmes, and curricula to more explicitly serve the needs of capital rather than the needs of society (see Noble, 2001; Levidow, 2002; 2005; Slaughter & Rhoades, 2004; Ward, 2012).

The neoliberal restructuring of the state to shift its duties and obligations from serving an array of social needs to serving the prerogatives of capital has been reflected in a new funding model. The dramatic decline in public funding has shifted the costs from being paid for collectively, by pooling society's resources, to imposing them individually onto students and their families, first by the imposition of tuition fees and then, for the past 40 years, by their rapid rise. To pay the costs students, have not only had to work more hours of, mostly low-waged, labour but borrow more to fill in the gap between the inflated tuition fees and stagnated public grants. Students and their families are borrowing more against their future wages.

In countless ways, both obvious and hidden, public and private non-profit colleges and universities have been reorganised to function according to the logic of the market, in a process referred to as 'academic capitalism' (Rhoades & Slaughter, 1997; Levidow, 2002, 2005; Slaughter & Rhoades, 2004). From the perspective of academic capitalism,

<sup>2</sup> California Community Colleges Chancellor's Office, http://datamart.cccco.edu/DataMart.aspx, 2015.

however, OLE is merely a symptom of 'new management strategies' shaped by neoliberalism, commercialisation, and entrepreneurialisation intended to make the campus operate more like a non-profit corporation (Slaughter & Rhoades, 2004; Ward, 2012).

Higher education has undergone two phases of commodification as it has come to be acknowledged as a source of profit making: the commodification of research and of instruction (Noble, 2001:26–7). The passage of the 1980 Bayh-Dole Act allowed the patenting and commercialisation of publicly funded research of academic workers. The venture capital for entrepreneurialisation came from tax revenues, rising tuition fees, and bond debt to finance new commercially oriented public-private partnerships, labs, programmes, and faculty. The manufactured crisis of austerity puts pressure on university administrators to reduce costs by adjunctifying the faculty, increasing class sizes and teaching loads, reducing course offerings, and refocusing their teaching, courses, and research to serve the dictates of capital, all of which redirect resources to the commodification process (Ovetz, 1996a, 1996b). In the community colleges, this has also meant paring down the mission to transfer to four-year universities and job training for local businesses.

Colleges and universities are also turning the instruction process, course content, and the courses themselves into new profit-making products, services, and corporations that become the alienated products of academic labour. As Noble warns, 'instruction has here been transformed into a set of deliverable commodities ... a shadow of education, an assemblage of pieces without the whole' (Noble, 2001:3–4).

The four-decade-long fiscal crisis of higher education had provided an impetus for overhauling the way it is delivered. Referred to alternately as 'reform', 'innovation', 'efficiency', 'doing more with less', and 'student access and equity', this overhaul is fundamentally the imposition of a new division of labour (Ovetz, 2015a; 2015b). Academic labour has been subjected to Tayloristic time-motion studies in order to rationalise, fragment, automate, disempower, and deskill the professorate. Combined with the dramatic decline of tenured faculty to about 25% of the faculty and austerity, many powers, such as hiring and firing, curriculum planning, educational technology, and admissions that were once the purview of the faculty have been transferred to a growing tier of mid-level management. The remaining 75% of faculty are non-tenured full-time, part-time contract, and graduate student professors and lecturers whose contracts are regularly renewed and paid by the hours spent in the classroom, some earning as little as US\$10 per hour (The Coalition on the Academic Workforce, 2012). As a result, the numbers and power of administrators continue to grow in order to manage both academic labour and the new business ventures (Rhoades & Slaughter, 1997; Ginsberg, 2011; Ward, 2012).

Growing class sizes and course loads, declining numbers of full-time faculty to share the load, and the pressures of commercialisation have increasingly alienated the faculty from core decision-making functions. The erosion of governance authority works like a feedback loop as fewer and fewer tenured faculty have less and less say over faculty hiring. Vacancies are filled by contingent adjunct faculty who are neither paid nor have the time to participate in governance responsibilities. As more courses are taken out of the classroom, standardised, and put online, the professorate at all but a tiny proportion of elite universities is being disempowered, deskilled, deprofessionalised, and proletarianised as waged workers (Rhoades, 1996; Noble, 2001; Schapper & Mayson, 2005; Ward, 2012:8, 115; Ovetz 2015a, 2015b). The gender and racial division of academic labour has been exacerbated by the fact that 62% to 81% of adjunct faculty are women and 74% to 84% of all women of colour faculty are adjuncts (The Coalition on the Academic Workforce, 2012:7; Curtis, 2014:17 and 54).

Every so subtly, the slow drift has been towards reconstituting every academic and student as a rational, profit-maximising actor. The increasingly contingent faculty adapt to these pressures by shifting their research focus to that which will make them attractive miniature revenue generators for potential tenure-line employers (Gould, 2003; Slaughter & Rhoades, 2004; Ward, 2012). In the classroom, faculty inflate grades to increase the scores on their student evaluations that determine whether they are rehired the next semester or can hold or land a tenured position. The rising costs subtly coerce students to study only that which promises a 'return on investment' in terms of higher future wages to pay off their current debts. Pressure to pursue higher grades and speed up their matriculation increases even as their time to study precipitously declines from having to work for wages now.

While each of these processes is well documented, little has been said about how they have transformed the division of academic labour and the hidden curriculum. Faced with pressures from austerity and privatisation, academic managers have sought to rationalise academic labour by deskilling (adjunctification) and standardisation (OLE). The introduction of 'disruptive' technology that 'unbundles' academic labour into its component parts in order to move education out of the classroom and online has been a central component of the strategy of rationalisation (EDUCAUSE; Christensen et al., 2011; Thornton, 2013). OLE simultaneously accelerates the deskilling, disciplining and disempowerment of the faculty while also vastly expanding work time and surveillance (Noble, 2001:32).

Despite the high start-up costs for consultants, equipment, facilities, and training, the fixed costs of OLE diminish over time, are shared by other locations along the production process that exploit the new labour power, and reduce the cost of academic labour by substituting cheaper contingent labour and non-faculty technicians for faculty staff. The cost of OLE is further reduced by avoiding the continuing fixed costs of libraries, classrooms, and campus services such as advice and counselling (Noble, 2001:29–30). OLE has further shifted the costs of education to the student so that they are now paying nearly the entire cost of their own self-discipline, albeit stripped of the *accoutrements* of college such as being a full-time student who can take advantage of all the resources of college life.

Despite the fact that students are the central product of higher education, student labour power is commonly obscured or overlooked entirely in favour of portraying students as consumers of education as a commodity (Noble, 2001:3, 2002; Levidow, 2002; 2005). Alternatively, education is perceived as a producer of commodities, such as specialised curricula, but not student labour power (Hayes & Wynyard, 2002; Schapper & Mayson, 2005). For example, Levidow describes a strategy of neoliberalism in which the 'student-teacher relations are mediated by the consumption and production of things, for example, software products, performance criteria, etc.' (Levidow, 2002:229). This approach ignores the fact that student labour power is being produced by consuming the labour power of faculty in universities in a capitalist society. Despite decades of neoliberalism, many scholars of higher education concur with Ritzer's thesis that 'the contemporary university is not primarily a means of production' but rather mimics the services industry by serving its customers in a convenient, hyper-commercial manner he calls the 'McDonaldisation of higher education' (Ritzer, 1998:153; Woudhuysen, 2002).

In contrast, this study of the academic division of labour finds students integrated into the relations of production as producers of their own unwaged labour power, mediated by waged academic workers, that will be sold as waged labour (Caffentzis, 1975; Wages for Students, 1975; Ovetz, 1996a). Part of the confusion is that students are seen as relatively privileged absent the specific conditions they face. As former students ourselves, professors commonly commit a logical fallacy by conflating their relatively privileged position in the wage hierarchy today with their former status as students.

According to Levidow, the introduction of information and communications technology into higher education to individualise and flexibilise education serves the objectives of neoliberalism by making the individual workers responsible for managing their own labour (Levidow, 2005:159). This illustrates Marx's observation that 'the relations of production are within the productive forces' (Marx, 1957:12). It is possible to take Levidow's point further by analysing the organisational logic of OLE as reflecting the need for a new type of self-disciplined labour power that works under the conditions of ubiquitous surveillance: the panopticon, as Foucault named it, that so permeates modern society and has turned the classroom inside out so that 'the capitalistic social relationship is concealed within the technical demands of machinery' (Panzieri, 1976:9; Foucault, 1995). Disciplining labour to work remotely under ubiquitous surveillance extends the possibility of further colonising unwaged reproductive labour inside what Tronti called the 'social factory' (Tronti 1962, 1973). Such disciplined 'flexible' or 'contingent' labour corresponds to the changing global division of labour in the post-Fordist period of 'flexible accumulation' in which low- and semi-skilled technology workers manage unskilled contingent workers throughout the global production process (Oberhauser, 1990; Robinson, 2002:1063-65).

Driving the demand for more self-disciplined workers is the movement for substituting competency and skills as learning goals, in place of content. A range of US and international reports have used a manufactured 'skills gap' to shift control of instruction to administrators while standardising the curriculum to focus on task completion. In the USA, initiatives funded by Lumina and Gates, such as EDUCAUSE, have targeted public higher education for movement towards measurable outputs such as 'learning outcomes' and progress towards graduation and transfer<sup>3</sup> (Complete College America, 2011; Headden, 2011; California Community Colleges Student Success Task Force, 2012). Using the fiscal crisis as a justification, more students are being channelled into OLE with the ostensible aim of opening up access and speeding

<sup>3</sup> EDUCAUSE is a corporate-funded consortium of campus management officials and private companies that actively promotes neoliberal restructuring of higher education such as OLE, 'competency based learning', and outsourcing under the guise of being an 'objective' think tank.

up progress. Despite what Ward calls a 'clever class-based recoding' of reforms to broaden 'access', 'equity', 'inclusion', and 'social justice' while 'closing the degree gap', these efforts have continued to widen the gulf between resource-rich private and elite public universities and the rest of public education into two systems, separate and unequal not just in resources but also in the purpose of the education provided.

As Ward notes, 'These ideas were put forward not just as a new version of the vague, ill-defined, older notion of the liberal arts, but as measurable and transferable skills that students could showcase to future employers' (Ward, 2016:28). But this raises three unanswered questions. What exactly are the 'measurable and transferable skills' employers desire, and how do these 'reforms' actually produce them? Little has been said about how the preferred delivery mechanism of competency- and task-based education actually teaches competency and task completion. What is the difference between the kind of worker produced by content-based instruction that encourages abstract and critical thinking and competency and task completion? After all, college-educated workers have long produced exploitable labour power, so why the shift in focus? The answer lies in an analysis of the structural logic of OLE technology which trains students to complete tasks without immediate supervision in a work environment of ubiquitous data-driven surveillance.

The anomaly of OLE remains. If it is intended to produce the more disciplined workers needed by capital, it is unclear how this goal can be achieved by deskilling and reducing the quantity of academic labour. OLE is subject to what Caffentzis calls the 'zerowork paradox', in which the declining contribution of academic labour in the production of student labour power reduces its profitability to capital (Caffentzis, 2013; Ovetz, 2017). As student labour power continues to be produced with ever less academic labour, the 'inevitable result has been not only a degraded labour force but a degraded product as well' (Noble, 2001:4). Ward concurs with this assessment, writing that 'in order to be a better auditor, the neoliberal state needs the big data generated by the continuous monitoring that assessment provides, even if the data are limiting, self-serving, self-perpetuating, and of suspect quality' (Ward, 2015:14). This is certainly reflected in the continuing dissatisfaction of employers with the quality of labour offered by graduates and continues to drive the neoliberal assault on higher education like the proverbial dog chasing its own tail (Noble, 2001:4).

However, contrary to these critiques, OLE is actually extremely profitable when the entire global system of flexible accumulation in the post-Fordist era is taken into account (Oberhauser, 1990; Robinson, 2002:1063–65). Rather than producing little value, OLE shares in the average value produced throughout the social process of production. As dead labour, the fixed capital passes along a share of its value to the labour power of each disciplined student (Ovetz, 2017). As Marx explained:

We are concerned only with the average composition of the sphere of production as a whole. ... The individual capitalist ... is right in believing that his profit does not derive just from the labour employed by him or employed in his own branch. This is quite correct as far as his average profit goes. How much this profit is mediated by the overall exploitation of labour by capital as a whole, i.e. by all his fellow capitalist, this interconnection is a complete mystery to him. (1981:270) OLE produces disciplined labour power that meets the needs for contingent 'flexible' workers who are always prepared to work and can work remotely with little or no direct supervision under conditions of ubiquitous surveillance.

# Like teacher, like student: the new division of academic labour

The globally networked computer has been celebrated as a 'disruptive' innovation that is altering the way higher education teaching is delivered and processed (Christensen et al., 2011). What is often overlooked is that OLE is also altering the *content* of higher education, changing the form in which students learn – the hidden curriculum. While there is an extensive literature advocating the introduction of information technology, little has been written about its role in reconstructing the changing hidden curriculum to socialise students to work under total surveillance and without knowing if they are being actively monitored. OLE serves to better discipline the student to work autonomously without apparent oversight while subjected to total surveillance.

What the research on neoliberalism's impact on higher education overlooks is that OLE is transforming the disciplining of labour power in two new ways. First, it is the means to deliver a new division of academic labour both in learning and teaching. Second, it is intended to increase social productivity, royalties, and profits also for the university 'innovators' or 'early adopters' across the entire production process (Ovetz, 2017). The subjectification of academic labour, in which individual students are presumed to be in control of when and how they 'study', is a refined technique that serves to better discipline the student to be prepared for a life of endless work, even when not working or when there is no waged work available. In short, OLE is the primary model for constructing the new relations of casual, contingent, or flexible work that now characterise up to 30% to 40% of the US labour force (Conlin et al., 2010; *The Economist*, 2015). This rapid growth of contingent labour is increasingly making the Northern labour force look more like the workers in the Global South, where, for example, about 84% of India's 470 million workers are classified as 'casual' or self-employed – in other words, contingent (Ness, 2015:85).

Higher education has adopted the casualisation of labour from the 'just in time' model of production, distribution, and logistics pioneered by the Toyota, Walmart, and McLean. It has done this by adjunctifying the faculty (Bonacich, 2003:41–8; Ovetz, 2015a). Adjunct staff have been disempowered by removing them from participation in shared governance. The mostly non-union contingent faculty teaching online are expected to be available and prepared for work at all times, to discipline ever-growing numbers of students in online courses and to do ever more unpaid labour outside the class, although they are only paid per classroom 'contact' hour. Both online and in the classroom, adjuncts are constantly in motion, whether paid or not, and must 'generally pay for the chance to work' through low-paying semester contracts (Bousquet, 2008:63).

Unwaged students have long served as the reserve army of academic labour. Undergraduates replace campus staff and graduate students replace non-tenured faculty and by doing so further push down the bottom to which the wages of all academic workers can fall. This problem is only accentuated by privatisation, outsourcing, and adjunctification. Yet adjunctification does not merely erode faculty working and student learning conditions, as is often asserted. It also illustrates the changing relations of production in the production and exploitation of labour power. To understand how adjunctification extends to students it is necessary also to examine *how* students do the unwaged work of learning. The online student is expected to be always prepared to work, to be constantly prepared to be assessed, evaluated, and measured, and to be endlessly monitored and surveilled without knowing whether this is actually taking place at any particular moment. The ubiquity of faculty student evaluations does not only make students an unwaged auxiliary of management by extending surveillance to the classroom by way of big data. Students learn to work under the threat of constant surveillance and to provide surveillance of the faculty through course evaluations as a normative function of their labour.

The ubiquitous growth of OLE is changing the division of academic labour, both for faculty and students. Disciplining adjuncts and students to work in the emerging high-tech panopticon is central to the relations of the so-called 'new economy'. Using new information technology and underpaid and overworked adjuncts to discipline more students with fewer resources is fundamental to capitalism's drive to increase the production of surplus value.

## Demagogues of disruption: deskilling the faculty

OLE deskills and disempowers the faculty by 'unbundling' the work of teaching. The 'disruptive innovation' of higher education involves the introduction of a Tayloristic time-motion study of teaching that rationalises and breaks up the skilled labour into its component parts. What is left is reassembled as discrete tasks delivered through information technology and redistributed among tenured and adjunct faculty, middle-level administrators, contractors, and technicians.<sup>4</sup>

According to the chancellor of the Maricopa Community Colleges of Arizona (a group that includes Rio Salado College, possibly the largest online public college in the USA), OLE makes it possible to rationalise, break up, automate, or redistribute faculty labour to non-faculty workers (Glasper, 2013). Rio Salado College's 23 full-time faculty staff, only 1.5% of the 1,577 faculty, manage 1,554 adjunct faculty who teach modules of standardised online courses starting on 48 Mondays with an enrolment of 43,000 online students (Gose, 2013). The courses are designed by as many as 18 adjuncts, course designers, technicians, non-faculty, 'experts', and private contractors such as textbook publishers. These standardised courses are delivered to a massive number of students by using assessment and measurement of both student and faculty work and 'interventions' by technical curriculum specialists to, in turn, assess, coerce, and direct both faculty and student work (Ovetz, 2015a). The rationalisation of academic labour in OLE demonstrates that 'teaching is no longer the province of faculty members who work with students in the classrooms, connected to the wider realms of knowledge through their departments and disciplinary associations' (Slaughter & Rhoades, 2004:22–23). Instead, entire core functions have become accountable to or directly managed by administrators rather than the faculty.

<sup>4</sup> The scale of the Tayloristic rationalisation of higher education can be seen in the extensive range of studies of academic labour being conducted by EDUCAUSE (see EDUCAUSE, http://www.educause.edu/eli).

The problem for these 'disruptors' is entrenched faculty power on campus, shared governance structures, and significant faculty unionisation that provides a modicum of rigidity with which to slow, deflect, and dilute such changes. For this reason, disruptors widely advocate bypassing shared governance processes and 'unbundling' faculty labour. These tactics are the means by which they seek to accelerate 'student success' by truncating or bypassing existing academic 'pathways' to transfer to four-year universities or graduation primarily determined by professors, administrators, accreditation agencies, and government through the shared governance process (Christensen et al., 2011; Martinez, 2013). The faculty is disempowered by breaking down academic labour into discrete tasks and automating and redistributing these component parts across the campus.

At Rio Salado College, the full-time faculty serve not so much as chairs of departments but as managers of adjunct staff. Full-time faculty are not only relieved of some of their teaching responsibilities but even of their academic governance duties, which are taken over by various adjuncts, administrators, and technicians (Smith & Rhoades, 2006:105; Smith, 2007:63; Headden, 2011). The shared governance of both teaching and faculty is unbundled and redistributed to select adjuncts who serve as Instructional Coordinators, Discipline Specialists, and Lead Faculty that manage other adjuncts, monitor students, and handle departmental processes (Glasper, 2013). In this way, adjunct line managers are used to discipline fellow adjunct digital line workers.

Courses are also standardised, so that any adjunct, contractor, or 'content specialist' can teach separate modules of a single course. This so-called 'one course-many sections' model has been cribbed directly from the for-profit universities which, despite recent dramatic bankruptcies, lawsuits, and federal regulatory penalties, have made a lasting impact on public higher education.

The rationale for the disruptive model to move online, standardising, deskilling and disempowering the faculty, is to achieve 'equity' in response to the growing number of working class students and students of colour clamouring for access to higher education in order to achieve a marginal incremental increase in future wages. According to the demagogues of disruption, adjunctification or 'indefinite scalability' – for example, 'just in time' higher education (Ovetz, 2015b) – makes it possible to meet enrolment growth but not necessarily educate those that enrol (Glasper, 2013). But such disruption is merely a vague euphemism for breaking and taking the personal relationship between faculty and student, between content and learning, between faculty and curriculum, between faculty and shared control over academic governance of the campus, and ultimately between higher education and serving the needs of the working class who are disproportionately channelled into these courses.

## The eyes that must see without being seen: OLE

Online courses delivered by one of several course management systems (CMS)<sup>5</sup> are the latest innovation in the disciplinary role of higher education to train students to work

<sup>5</sup> A CMS is the computer programme used to structure and operate an online course. Among the most common are Moodle, Catalyst, Canvas, and Blackboard.

'autonomously', all the while actually working under the fear of total surveillance that assesses, judges, grades, and categorises.

OLE is characterised by two aspects of disciplinary power: what Foucault called the character of being simultaneously visible and discreet, 'the eyes that must see without being seen' (Foucault, 1995:187). Appearing to be visible makes apparent the process of surveillance and its expected use to evaluate, examine, classify, assess, analyse, compare, grade, and categorise the individual's compliance with the norms, rules, and assigned tasks. Yet it is also discreet, in that it is unobtrusive, muted, inconspicuous, and unnoticed.

The eyes see without being seen in several ways. Although the CMS displays the period of time when the professor has logged in and out, students are unable to know whether they are actively being monitored even when it is indicated that the professor is logged in. The student, always suspecting that she is under surveillance, is always active, or appearing to be active. The duality of being what Foucault called 'visible and unverifiable' is central to the new division of labour in which workers are expected to work, be productive, or even available for work contingently. Without any appearance of visible monitoring, students and faculty are threatened with the potential of ubiquitous surveillance, the quantification of measured productivity in a relentless barrage of student evaluations, enrolment reports and student, departmental and programme 'learning objectives' (Foucault, 1995:201). The adjunctification of the faculty proceeds alongside the disciplining of student labour power. Surveillance is total, panoptic, and invisible.

As the uprisings in Latin America, the Arab Spring, Occupy Wall Street, the Landless Workers Movement in Brazil, and the Indignados Movement in Spain have demonstrated in the past two decades, external threats of low-waged work, poverty, homesslessness, debt, and other forms of precarity are no longer sufficient in themselves to act as disciplinary mechanisms (Mason, 2013; Ness, 2015). These disciplinary strategies are external, outside the body. The panoptic CMS, on the contrary, simultaneously socialises the adjunct and student to internalise the discipline required to work without authority, external coercion, or threats. The student is trained to become a human Turing machine who recognises tasks and reproduces the patterns in which they appear (Caffentzis, 2013). The duality of the visible and discreet underlies one of the flaws of the cognitive labour theory (Hardt and Negri, 2000) which regards the creative labour of cognitive workers as 'autonomous' labour, somehow outside of the labour theory of value in which exploited labour produces surplus value and profits. What cognitive labour theory misses is that such workers are disciplined and socialised to work remotely or flexibly under threat of surveillance - conditions mistakenly confused with 'autonomy'. This influential theory overlooks that such workers do not choose the focus on their work and do not work autonomously. Rather, their labour exists at only one juncture of the larger global accumulation process that links miners extracting the rare earth deposits of the Congo to the computer assembly lines of China to the classrooms of US campuses (Ovetz, 2017).

#### CMS: learning together, alone

The CMS illustrates the totality of the changing division of labour. Although the CMS is portrayed as a 'content delivery system', its most important aspect is not the content but the hidden curriculum – the form, organisation, and structure of the programme in which the online learning takes place. While it brings students together virtually, the CMS maintains a false separation between students as discrete factors in the online classroom who, in theory, are learning together, while completely alone. Levidow observes that the introduction of information technology into education has the effect of obscuring the social character of capitalist production because it 'individualises skills that can only exist in a social collectivity or network' and 'fetishises social skills as properties of individuals' (Levidow, 2005:230). This obfuscation continues when students become waged workers in the knowledge economy in which their isolation and flexible labour conditions are confused with creative autonomy.

Although touted for its flexibility and the way it allows students to participate asynchronously, the learning and evaluation process is inseparable from the time element in the CMS. Classroom time is mediated by nonlinear personal interaction between faculty and student and used to measure the identification of relevant information, application of concepts to phenomena, making new comparisons and connections, and reaching new conclusions in verbal and written assignments, exams, and projects. While students are still graded in a time-specific course, learning unfurls over the course of quarters, semesters, and years. In contrast, time in the CMS is impersonal and asynchronous, measured as variables of discrete tasks to be completed in any order in complete isolation, mediated exclusively by communication technologies, and assessed based on the completion of tasks by their deadlines. Classroom time is specified as weekly class meeting days and times. However, time is delimited in the OLE course because the class is theoretically always meeting for each isolated student in the ether and classwork is always being expected, assessed, and evaluated. The delimiting of time in the CMS vastly expands the work day while training students to normalise it in their work life.

The criteria for assessment in the CMS are not based on learning but proceed through a series of discrete tasks in which the completion – not the mastering – of the task is required to proceed to the next step in the series. This illustrates the vast difference between learning in the classroom and in the CMS. The mode of learning in the classroom is building new rhizomatic connections to enable the understanding of, and ability to act on, the relationships of content knowledge in order to proceed through Bloom's taxonomy. In contrast, an OLE course is structured according to the need to proceed through a series of discrete tasks. The lack of personal interaction makes the change in assessment unavoidable. Lacking the complex information that can be gleaned from human interaction, learning can only be assessed by the completion of tasks in a disciplined and timely manner. It is this 'personal touch' characteristic of face-to-face learning that disruptors dismiss as inefficient and unproductive – ultimately because it is labour-intensive and difficult to quantify.

This shift in assessment from learning to task completion may not be entirely an oversight. The logic of OLE is a closer fit to training, which as it grows, colonises all of

the functions of education. Noble distinguishes between training and knowledge as fundamentally opposed to one another. Training, he observed, involves alienating knowledge from the producer and its transformation into skills to be used by another for exploited labour. Knowledge, conversely, is 'not the disassociation but the utter integration of knowledge and the self' in an interpersonal relationship between student and teacher 'that aims at individual and collective self-knowledge' (Noble, 2001:2). By rationalising and standardising academic labour into discrete components of course materials, content, and assessment measurements, OLE is imperceptibly transforming education into training to prepare the student for low or unskilled waged work.

The central feature of the online course is the written forum post or uploaded audio-visual materials. A student completes a task in or outside the CMS architecture such as reading, completing a task, passively watching media, and conducting research, and then returns to the CMS environment to document what has been learned. The forms of the task are many, including following a link, solving problems, reading chapters, attending a meeting, observing behaviour, making a video, reporting on a project, and so forth. The forum posting is assessed by the faculty member and the student proceeds to the next task. Because the quality of social context of shared learning in the classroom is absent, forum posts tend to achieve task completion that focuses on providing the required information in the absence of genuine exchange or discussion. Student posts are made in physical isolation and are out of synch with one another, absent the complex social context of the classroom. If tasks can be completed asynchronously, a student may or may not be working on the same task at the same period of time as the other students, so that they are learning alone, even if ostensibly together. From the students' perspective, the emphasis is on individualised completion of tasks, not shared discussion of the lessons learned that might allow them to reach higher levels of abstract and critical thinking. Because the student is literally facing a computer, not the other students, the interface itself reinforces the hidden message that the particular individual student is the centre of focus, not the collective classroom setting. Whether someone else understands or learns from the task is irrelevant to whether any particular student can proceed to the next task. There is no longer class time in which the professor addresses the particular needs of any one student, shared with all the other students. The dynamic of classroom discussion, questioning, and debate are no longer spontaneous and organic but a series of isolated 'posts' disembodied from the collective learning experience and out of synch with each student's individual pace. In this way, the CMS 'unbundles' learning from human interaction and reduces it to simple tasks done by individuals.

Even assessment and examination are fundamentally changed by the new time element. Students' completion of discrete tasks is assessed by their performance at discrete moments in time. The CMS automatically keeps track of all activities in its environment which are accessible to the faculty at any time. Because there is no face-to-face or other personalised manner of learning-teaching interaction between faculty and student, each task must be assessed numerically only. The completion of each task is automatically tracked, aggregated, or averaged in some way, adding up to the final determination of task completion, the grade. The CMS also makes it possible to erase or reverse time and change the assessment of performance on discrete tasks. It is possible for students to redo a task or answer exam questions an indefinite number of times to complete a task using an exam test bank that has been programmed to allow the student a set or unlimited number of tries to answer a question correctly. New task work wipes out all record of the old and a new numerical assessment can be entered. Similarly, the level of proficiency measured by assessment and examination is ratcheted down from comprehension to completion. Tests no longer serve to tell students what they do not yet understand but become a task to be completed, a toll station to be passed in order to proceed to the next sequential task.

OLE advocates aim to use computer and information technology to break the 'time bound, place bound, efficiency-bound, and role-bound architecture of traditional schooling' (Thornton, 2013:43). Breaking these bindings is necessary to make the case for so-called 'competency-based learning' in which 'learning' is 'objectively' measured by the student completing a sequence of tasks as a measure of 'competency' and to complete them remotely, independent of monitoring. In this role, the faculty is transformed from content expert, transmitter of knowledge, and facilitator of learning and understanding into taskmaster and virtual assembly line foreman. This is what is meant by the 'flipped classroom' in which the personal interaction during physical class time reduces the professor to a foreman, what Schapper and Mayson call a 'process labourer', *verifying* work done offline rather than *educating* (Schapper & Mayson, 2005:186). Instruction has become unbundled and what remains has been deskilled and reduced to verifying task completion. That the 'flipped classroom' is being used even by tenured professors demonstrates the insidious influence of OLE on the in-person classroom environment and all academic labour.

Turning the professor into a foreman follows the path of other highly skilled labour transformed into what Marx called the 'appendage' to the machine worked by the 'wretch' (Marx, 1976:548, 799). The measurement of competency in task completion is hardly random but serves the shift from the focus on inputs (resources which can be struggled over and reappropriated as tools in the class struggle) to outputs (measurements of performance that indicate the quality of disciplined labour for capital) that now dominates higher education. 'Skills and drills' is presumed to be measurable, in contrast to the complex personal interactions traditionally inherent in teaching and learning. The obsession with measurement 'has been and will be used for profoundly undemocratic ends - as a disciplinary mechanism for college administrations, government entities, and accrediting agencies that seek to "objectively" measure the practices of institutions with vastly different resources serving dramatically stratified student bodies' (Bennett & Brady, 2014). This is what Shapper and Mayson call the managerial pressure to 'measure broad outcomes across a range of standardised activities' (Schapper & Mayson, 2005:184). As with the use of Academic Performance Index scores (issued by the federal and state governments to 'grade' public schools), used to take and break public schools and turn them over to charter corporations, the shift to 'measurable' Student Leaning Objectives makes an argument for applying this new division of academic labour more broadly by identifying 'failing' institutions that need to be 'reorganised'. Not surprisingly, the sites where these are applied are public colleges and universities increasingly populated by working class and students of colour.

The virtual space of the CMS also amplifies its disciplinary power. Student learning is focused on completing tasks by literally filling in boxes of different sizes with text,

attachments, or audio-visual files. Faculty, likewise, teach and assess by posting comments and selecting the appropriate number grade in a box. Students cannot be assessed for any characteristics of learning or behaviour that are not already foreseen, recorded in writing or audio-visual recordings and entered into the box. Crossed out text, emotions, behaviour, notes on the back side of the page, facial expressions, body position, tone of voice, style of handwriting are all stripped of value, not only as means of information and communication of comprehension to the professor but also as evidence of student learning. Also gone are the many opportunities for one-on-one personal faculty-student interaction in the classroom, during office hours, and elsewhere on campus, available for assessment (Rhoades, 2013:78). In the CMS, students are merely the sum of the words they can type, the words used to self-report on their own learning, and the timed quantification of their own labour. The 'severe and insistent disciplinarian' of what Veblen called the 'machine process' reduces thinking to 'standard units of gauge and grade' (Veblen, 1948:336).

## CMS: the panoptic classroom without walls

The requirement for self-reporting the quality of one's own labour illustrates how CMS is structured and organised as a total surveillance system in which students are made complicit in their own monitoring and discipline. The CMS is always on, and always watching, although it is often difficult for students to know if anyone is actually paying attention. All students and professor are relentlessly tracked by the time and date they entered the CMS, what they put in the boxes, how long it took, when they left, how long it was since the last time they logged on and how long they stayed.

One commonly built-in feature of a CMS is the appropriately named PACE (Progress and Course Engagement System) that monitors and alerts the faculty and students of 'at risk behavior', or inadequate work discipline (Glasper, 2013). The PACE system serves to coercively shape or determine the pace at which students and faculty work. Using predictive modelling technology based on the accumulation, retention, and analysis of so-called 'big data', PACE systems provide a panopticon of total seamless surveillance of online work by providing an option to automatically track log-in frequency, engagement, and the completion of assignments and alert students who have not logged in for a specified period of time to prompt them to improve their work discipline.

Student activity in the CMS can be observed by more than just the eyes. They can be observed by discrete task, by the chronological order of activities, by group, as an individual, by their daily activities on campus that leave a digital record, and by the totality of their assessments. Because the CMS is always on, the measure of time is reversed, so that the focus is no longer merely on their time *in* it but also how long they are *out* of the CMS. Time outside the CMS is also tracked until the next time they log in. Colleges are increasingly using data mining of aggregate and individual student performance, and even non-academic activities and behaviours, by culling data from social media or swipes of campus ID cards with built-in radio frequency identification cards (RFIDs; Rubel & Jones, 2014). These data are then fed into the CMS using predictive analytics to shape the content of the online course to the moment-by-moment academic performance of an individual student. For example, if a student

appears to spend more than the average amount of time on a specific task, spends too little time logged in, or has a below-average grade at any point in the course, the CMS may trigger a requirement that the student complete remedial tutoring before proceeding, change the difficulty level of the task, or even be locked out from the course or required to change majors (Ovetz, 2015a).

Using data for surveillance blurs the line between inside and outside the CMS and integrates the relations of production and reproduction of what Tronti called the 'social factory' in which 'the non-paid part of the social working day increases with respect to the paid part' (Tronti, 1962). Time outside the CMS is expected to be time preparing to work, reproducing one's labour power if not doing actual work, and not yet documented in the CMS task box. The value of time outside the CMS is measured by the time spent preparing to work inside the CMS. All of life effectively becomes subsumed into work, either preparing for or actually doing waged work. In Tronti's social factory, 'the social character of production has been extended to such a point that the entire society now functions as a moment of production' (Tronti, 1962).

The use of data mining to coercively shape work in the CMS moves the student away from the open-ended process of critical thinking, making unexpected connections, exploring new areas of thought or experience, and the unlimited range of human emotional and physiological interaction. It puts in its place movement through a series of discrete patterns that appears to adapt to some measurable indicators of behaviour. Learning is replaced by training the student to be able to identify repeatable patterns of tasks and to proceed through them with the least amount of effort (so as to reduce the possibility of additional tasks or difficulty levels) or, if there is an expectation of a higher assessment outcome for doing so, the greatest. Paradoxically, it thus trains workers to minimise effort, thus encouraging the behaviour that the Industrial Workers of the World (IWW) has called 'striking on the job', the resistance to work that Noble called the 'degraded product' of labour power (Noble, 2001:4).

Complete and boundless surveillance is the organisational rationale for the disciplinary universe of OLE. The CMS restructures learning as discipline, the ability to log on, remain, and complete one's task within the established time period with no need for prompting by the professors' physical or virtual presence in any way. Although the presence of student and faculty in the CMS is always recorded, indicating whether an individual may be working or monitoring at any moment, unless the system is set to automatically log a student off (because of a lack of recent activity), it is impossible for that individual to know if anyone is actually watching at any given moment. The CMS shapes the student's willingness to work without any overt supervision and then report on their own work much more than the classroom, where students and faculty meet physically at a regularly scheduled time.

The fundamental lesson of the new hidden curriculum is this: one must work alone, consistently, in a manner that can be measured, without any evidence of apparent supervision and must reproduce one's labour power in order to be prepared to work at any and all times. In this way, OLE has become an assembly line for producing contingent and flexible self-disciplined workers for the new division of labour. It is the technological means for internalising the willingness of the adjunct and student to subjectify themselves. Bennett and Brady and Bousquet are only partly correct that the

focus on 'skills and drills' is preparing students for low-skilled jobs. They are being disciplined to work with self-discipline regardless of the skills level, to be interchangeable, to complete fragmented tasks with little or no direction, and, when waged work is no longer available, to withdraw into unwaged reproductive activities in preparation for future waged labour (Bousquet, 2008; Bennett & Brady, 2014). In this new division of labour the self-disciplined adjunct faculty, always ready to complete discrete tasks (teaching individual classes for a defined contract period as long as they meet enrolment requirements), becomes integrally linked to online student learning for self-discipline as contingent labour. Cognitive academic labour is not autonomous creative labour, as Hardt and Negri (2000) assert, but the self-imposition of unlimited abstract labour, the unwaged preparation to always be ready to work.

In the CMS the individual works alone in a diffused network of surveillance. But the appearance of isolation is misleading. The computer places the individual within a vast unseen diffused network of students working under its relentless digital gaze. The disciplining of labour power is, paradoxically, both individual and social, isolated and diffused, discrete and connected, autonomous and directed. It is the ultimate realisation of Foucault's panopticon in that it requires no walls or overt means of observation. It inculcates a sense of ceaseless surveillance that trains the individual to work reflexively as if being perpetually monitored and assessed. In turn, learning is subtly transformed into the work of completing tasks in the knowledge of being monitored, recorded, and assessed. Foucault describes this as 'making architecture transparent to the administration of power, of making it possible to substitute for force or other violent constraints the gentle efficiency of total surveillance' (Foucault, 1995:265). OLE turns the panopticon inward and strips it of its walls, guard towers, and cells at the same time that it strips the classroom of its walls, seats, lectern, and professor. Stripped of their walls and cells, the classroom and prison migrate ever closer to one another across the border of what Foucault called the 'carceral system' of 'the disciplines' (Foucault, 1995:318 and 321).

#### Logging out: click to save and return to course

A close examination of the rationalisation of academic labour of both faculty and students in OLE clarifies the central role of the technology of OLE in the relations of production. Rather than constituting just a cost-saving strategy or innovative solution to demands for access, OLE mirrors the relations of production in the labour of faculty and students. The logic of the technology that drives OLE is analogous to the logic of contingent labour, the self-disciplining of labour power that is always available for waged work. More than four decades after higher education's service to capitalism was contested and disrupted, neoliberalism has not only transformed the management of colleges and universities but has also reorganised teaching and learning to further strengthen their role in delivering disciplined labour power while dismantling the last vestiges of the professorate.

As working class students and students of colour come to dominate our colleges and universities, they are channelled into the under-resourced and restructured lower strata of public higher education where adjunctification and OLE have become the prevailing model. A New Jim Crow is emerging in US higher education, especially in the community colleges, where students who are working class and of colour predominate.

In 2010, 68% of California community college students were people of colour, a 12% increase since 1996 (California Postsecondary Education Commission, 2015). The number of students taking any classes online rose by 25% between 2003 and 2007 (US Department of Education, 2011). In California, 25% of all community college students took an online class, an increase from 12.5% in 2005-2006. It is estimated that 12.3% of all classes are completely online and half are partly so (California Community Colleges Chancellor's Office, 2015). Although the number of white students taking any distance education courses is larger than any group of students of colour, the percentages taking online courses are comparable, except for black students for whom it is about 33% higher (US Department of Education, 2011). However, the distance education data are not disaggregated by system of higher education. Since students of colour make up the supermajority of community college students, they can be expected to be taking online courses at higher percentages as well. When we consider both sets of numbers in aggregate, the policies advocated by the California Student Success Task Force can be seen to be covertly resegregating students of colour into separate places in an unequal system of higher education (California Community Colleges Student Success Task Force, 2012).

It is past the time to confront the neoliberal process of reorienting higher education to serve the demands of capital for self-disciplined workers who have internalised the relentless gaze of the panopticon that sees without being seen. To do so, it is imperative that we critically examine the impact of adjunctification and OLE on the mission of higher education and ask again whose needs it should be serving. Impeding this restructuring will require new tactics and strategies for organised academic workers to introduce rigidities that might stem or even eventually reverse the tide so that the ship can be steered into new waters.

There is a close analogy between the division of academic labour today and industrial labour at the turn of the 20th century. When Taylorist rationalisation of production was being imposed, skilled workers were paralysed by hubris, believing that the new technology and organisation of production could never make their skills obsolete. These workers, represented in the USA by the American Federation of Labor (AFL), refused to organise with the growing numbers of primarily immigrant and black un- and low-skilled workers populating the factories alongside them and chose to act alone. Ultimately, their strikes were widely defeated, leading to a worsening of the conditions of the most vulnerable workers. Countering the predicament of the professorate today will take a close analysis of the new division of academic labour, OLE, and new tactics, strategies, and objectives. It is unavoidable for not only tenureline faculty to organise with contingent faculty but other waged academic workers, students, and local communities.

Today, many tenured faculty members seem to have a misplaced certainty that control over closely held academic knowledge cannot be wrested from them. This encourages the (mostly white and male) tenured faculty to carve out special deals with mid-level administrators to protect their status and privileges such as a light teaching load, sabbaticals, and minority department rule of the supermajority adjunct faculty. But just as skilled workers were soon outnumbered on the shop floor by unskilled, low paid, and unorganised workers doing their work, rationalised into discrete repetitive tasks, tenure-line faculty watch passively as adjuncts are delegated the bulk of the teaching and proliferating online courses. This two-tiered academic labour force is tolerated on the basis that it will not interfere with the prerogatives of tenured faculty. As a result, tenure-line faculty are cooperating in their own demise (Moser, 2001). By accepting this divide-and-rule strategy and distancing itself from campus 'politics', the professorate has allowed tenure to be transformed from a right into a privilege and collaborated in the dismantling of its own profession. Today, dwindling numbers of tenured faculty stand alongside a vast army of migrant mindworkers of academia (like myself) moving students through our classrooms at breakneck speed, if they can enter and stay in them at all. In a reminder of Veblen's warning of 'the visible drift of things into the calculable future', faculty join students on a vast speed-up into a lifetime of contingent work in the predominantly contingent global division of labour (Veblen, 1921).

Dominated by tenure-line faculty seeking to protect their own prerogatives, faculty unions are locked into the AFL model of balkanised unionisation which places tactical and organisational constraints between tenured and adjunct faculty, staff, police, service, and teaching assistant locals. Each group works under a separate contract, if they have one at all, with different start and expiration dates, limited bargaining over wages and hours, trading incremental wage increases for productivity increases (e.g. growing class sizes), and abdicating academic control to the growing layers of middle management. As with the AFL skilled workers a century ago, when these fragmented locals strike, more often than not their defeat is sealed by their fellow campus workers continuing to work under their own separate contracts.

To defeat OLE and overcome the newly emerging division of academic labour will require new tactics and strategies that correspond to the current composition of capital. Our task has much to learn from the IWW resistance to Taylorism. The IWW took the existing relations of production as their point of departure for devising new tactics, strategies, and objectives. Their efforts to identify the leverage of unskilled workers to disrupt production made them a potent threat that was forcibly repressed at the end of World War I.

For example, the Metro Organising Strategy and state-wide or system-wide locals are re-visiting many of the assumptions about who to organise and what to organise about.<sup>6</sup> Faculty join all academic workers and students in single locals that encompass not only a single campus but all campuses within a metropolitan area. Despite this promising organisational strategy, they have yet to address the division of academic labour which is rapidly blurring the distinctions between faculty and administrative staff, particularly when it comes to who designs and 'teaches' online courses. Metro locals have yet to shift from focusing on collective bargaining over wages and benefits to a strategy for countering the movement towards the professorless classroom. Further work is needed to identify leverage, chokepoints, and tactics for resisting 'flexibility'.

<sup>6</sup> The Metro Organizing Strategy organises all contingent faculty in a metropolitan area into a single union local that negotiates a single contract for all of the colleges or universities. Because many contingent faculty teach at several of the campuses, this strengthens their collective power (Berry, 2005).

We need to question not whether everyone should go to college, as neoliberals are now doing, but whether higher education should exist to produce disciplined labour power or empower people to carry out deep social transformation. The central role of higher education in the information technology–driven global economy that links the campus to the rare earth mineral mines of Congo and the assembly lines of China provides academic labour with immense leverage to make our position felt. © Robert *Ovetz, 2017* 

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