

Exploitation of the Self in Community-based Software Production

Workers' Freedoms or Firm Foundations?

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Introduction

Knowledge emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry men pursue in the world, with the world and with each other.

Paolo Freire - Pedagogy of the Oppressed

Free Software and Open Source (FS/OS) constitute a new and open, evolutionary technological arena wherein hundreds and sometimes thousands of users voluntarily explore design codes, spot bugs in codes, and make contributions to the code in a co-operative communal fashion at odds with the otherwise hugely monopolized software market. This 'computerization movement' emerged as a challenge to the domination of the software market by such behemothic firms as Microsoft and IBM, and is portrayed as having a revolutionary 'ultimate goal'; 'to provide free software to do all of the jobs computer users want to do, and thus make proprietary software obsolete' (Free Software Foundation 2008). These developments promise emancipation from the strictures of scientific management and antiquated, hierarchical production relations. But in this paper, we ask, to what extent does FS/OS actually challenge the orthodoxy of hierarchies and power relations within the firm? Does the ego-less programming of the informationally buzzy bazaar really free participants from the stuffy pews of the cathedral¹ and truly challenge the essence of capitalism?

Emblematic of the way in which information society rhetoric often occludes more basic, underlying political questions, the intrusive bio-politics of informational capitalism is frequently and tautologically celebrated as an end in itself. For example, the writings of such theorists as Hardt and Negri, Poster, Lash, Jenkins etc. are all rich with novelty-based aspirations, but are rather more penurious when asked to supply examples of how more abstract, globally-fluid informational environments actually empower in practice. For example, Hardt and Negri rely upon the eponymously vague formulations of both *Empire* (2000) and *Multitude* (2005); Poster (2006) is excessively dependent upon dramatic (albeit clumsy) neologisms like *humachines*; whilst Lash (2002) and Jenkins (2006) over-privilege *immanence* (see Taylor 2006 and Lash 2006 for an extended debate on this theme) and *convergence* respectively.

An under-acknowledged issue in these works is the small number of workers who, even in the

more developed West, prove to be well-placed to profit from new mobilities when set against the much greater number of workers more typically on the receiving end of capitalism's fleetness of informational foot. Even if it is granted that informationalized jobs are growing steadily, we explore in this paper the naivety of the assumption that such jobs represent significant gains for the individual's quality of life when compared to industrial jobs or work done in a more obviously measurable and less 'flexibilised' way (Moore 2006). We show how this assumption fails to acknowledge the extent to which such re-skilling is subsidized by the personal initiative and self-training of a whole new generation of workers for whom an overtly felt ideological conflict with capital risks becoming replaced by a bio-political, naturalized sense that self-obtained skills smooth one's entry to the only game in town - the information society.

Braverman and other Marxist analysts revealed inequalities and power relations based upon labour regulation within the industrial capitalist production model. However, it can generally be agreed by both those on the left and right of the political spectrum that such contemporary community-based models of production of software as are found within FS/OS represent dramatically different production techniques than those devised by Ford and Taylor in the industrial age. In the 'Taylorist industrial model, Scientific Management's conceptualization of the worker demanded that 'brain work' should be 'removed from the shop and centred in the planning or laying-out department' (Taylor 1903[1998]: 30). By contrast, in sexy new informational-community-based models of production, *only* 'brain work' matters. Despite Foucault's insistence on the link between knowledge and power within 'concrete practices', scholars have not adequately considered issues relating to the precise nature of power relations and agency as knowledge is produced in the new accumulation regime of the post-Fordist information economy. Contemporary social science literature frequently makes the assumption that knowledge has become a product in a qualitatively new manner, but tends not to *critically* examine some of the negative consequences of *how* lucrative knowledge is formed.

Braverman also notes that 'as human labour becomes a social rather than an individual phenomenon, it is possible—unlike in the instance of animals where the motive force, is inseparable from action—to divorce conception from execution' (1974: 113). While 'conception' historically relied on management's exclusive power to define and manage work, this responsibility is now left up to workers themselves in unprecedented open and flexible production environments predominantly based upon the manipulation of abstract information. Mere workplaces are now increasingly interpreted as 'cultures'. A new light is thrown on the management of business and organisations that constitutes a shift from bureaucratic, mechanistic, rationalistic systems that traditionally constituted the notion of the firm. As an illustration of this 'cultural turn', terms such as *cultural/creative industries* and *cultural economy* have become unproblematically associated with naturalized rhetorical claims about the *sign economy*, *network society*, and the *knowledge economy*. To the extent this cultural turn has become naturalized, we risk overlooking the significance of such terms due to their glib familiarity.

In *Mythologies* (1973 [1957]) Barthes describes this type of process as a taming of semantic richness, an ideological production of an excessively naturalized sense of 'what goes without saying', and in *Difference and Repetition* (2004 [1968]) Deleuze uses the notion of 'the image of thought' to describe what is presupposed in unconscious, uncritical silence. Hence, it increasingly and unproblematically goes without saying that we now live in a knowledge economy, but how such a concept might be an essential contradiction in terms from various critical perspectives is persistently overlooked. Adorno deliberately chose the oxymoronic couplet, *culture industry*, in order to emphasize the self-contradictory notion of a culture that had become pathologically industrialized. In stark contrast to Adorno's innately critical juxtaposition, the simple use of the plural in the now common phrases *cultural/creative industries* has led to an uncritical acceptance of the commodifying effects of the information society that we now seek to re-problematize.

Community-based Models of Software Production: FS/OS - the new informational order?

Before the 1990s, software was mass produced within firm-based production environments and relied on restricted codes as a competitive tool for market capture. Users and developers of software responded by organising new communities of software production and the OS model emerged as a response to the increasing dominance that Microsoft held over the market. Richard Stallman, a researcher at Massachusetts Institute of Technology (MIT) led the way to a kind of uprising against proprietary software with a Unix-clone project he developed, GNU. Linus Torvalds later completed this project with the development of Linux. So Free Software was an antagonistic movement aimed to challenge copyright license agreements which were seen as restrictive and a hindrance to innovation. Participants in this movement protested that consumers pay for software but usually cannot study it to learn how it works, or work to improve its function, because they do not have the source code.

The term 'open source' was invented at the 3rd of February 1998 at a meeting in Palo Alto, California at a meeting aiming to create a new name for the flexibilization of software development that was not as threatening as the descriptor 'free', used originally to describe the communities of production who freely shared code (Free Software or FS). People in the business world negatively associated the word 'free' with cheap, problematic, non-professional, and so on. As a result of this meeting, a non-profit organization with the name Open Source (OS) Initiative was created alongside the trademark of the term 'open source'. This organisation published a formal definition of what OS is, to approve or disapprove copyright licenses according to that definition, and software published under one of the OS approved licenses could then begin to use the term 'open source'. While Microsoft has a Shared Source compatible with the definition of FS/OS, which represents a concerted attempt to free the market up for users to allow a more inclusive sphere for production of knowledge tools via production, authors who have responded to this chain of events often overlook an important

question that must be resolved before we can resign ourselves to the supposed emancipatory elements of this movement, and this is to do with individuals' *reasons* for participation. Furthermore, naïve tales of FS/OS do not look closely enough at the formation of hierarchies and conflicts within communities or at the actual everyday lives of those involved in the communities of production.

Cultural and macro-structural properties of community based models of work need to be contrasted to those of the firm to discern their relevance and implications for broader ethico-political changes within and across societies. The culture of community-based models does differ significantly, indeed almost diametrically, to the traditional versions of firm-based exchanges. However, participants within both organizational forms are involved in constructing and reconstructing realities which are ultimately, objects of economic calculations. Participants' actions and their management and governance need to be critically examined to understand whether community based models such as the OS community that challenge traditional understanding of property rights, ownership, motivation, and complexity; or the 'human firm' which challenges rational actor models, can become sites of contestation that fundamentally challenge the ideologies of market norms within which the conventional firm is a traditionally accepted actor. Does the community-based movement successfully realign economic identities and can it produce an economic 'truth' regime?

To assess whether FS/OS offers a realistic chance of producing a new informational social order, a critical re-evaluation is needed of both the commercial constraints that may still underlie its superficially liberating nature, and the degree to which the participants themselves may mis/interpret some of the potentially negative and ultimately disempowering nature of the apparent incentives for knowledge production within FS/OS that on closer inspection may be less than empowering from a non-capitalist perspective. For example, workers in a culturalized knowledge economy are exposed to, and perhaps are obligated to acquire certain learning processes that define work according to problem-solving strategies within production 'communities' of software developers. Arguably, authentic 'community' values are honoured more in the breach than the observance as capital merely finds more imaginatively intrusive ways by which it can interpolate its workers. Thus, this presentation of work as more of an intellectual game than traditional economic production is reinforced by such practices as Microsoft's 'campus' work environment in which the hacker-slacker generation moves seamlessly from college to workplace with scarcely a noticeable change in the carefully constructed informality of their surroundings (see Coupland 1995; Taylor 1998).

A transformation of skills is considered crucial for companies' knowledge production and workers' employability, despite widespread absences of training programmes within organisations. Nonetheless, several unprecedented learning and performance indicators are emerging, such as a requirement for creativity, flexibility, and andragogicalⁱⁱⁱ competence. These shifts represent a transformation of hegemonies for knowledge production both within models for business interaction,

and within the concept of workers' employability in knowledge based economies (KBE). Jessop refers to the KBE as a 'provisional, partial and unstable semiotic-material solution to the crisis of Atlantic Fordism' (2004). Mysteriously, International Political Economy (IPE) theorists largely overlook the role of workers in this transition to a globalised KBE, yet, the paradox is that workers within community-based models of production are so often income-less themselves, which calls into question the incentive for participation. If incentive is reliant on participants' re-absorption into the mainstream, such as to gain employment with established, firm-based giants of software production such as Microsoft, does this eradicate any claims to free market defiance, as OS and FS users advocate?

Economies today battle to capture the best talent for the most profitable production and accumulation of knowledge, and we are presented with technologically-mediated impacts upon the intellectual process of unprecedented ambiguity that are in danger of escaping normative or critical analysis. KBE work environments differ materially and symbolically, and require substantially different skills and intersubjectivities from participants than those found within the traditional firm. In this context, this article looks at incentives as well as emerging norms for participation within FS/OS models, linking these to recent transformations to expectations for employability in terms of learning abilities and worker performance. Since 'companies have emphasised employability in an attempt to shift the social and moral responsibility for jobs, training and careers onto the individual' (Brown et al 2003: 114), we have to ask whether participation within FS/OS is a kind of self-chosen training ground in the absence of training at the company level.

The care of self

This 'cultivation of the self' can be briefly characterized by the fact that one must 'take care of oneself.' It is this principle of the care of the self that establishes its necessity, presides over its development, and organizes its practice (Foucault 1986, p.43).

Foucault's notion of *care of the self* opens up interesting theoretical angles than the more narrowly economic focus that tends to dominate discussions of FS/OS. It was developed by Foucault towards the end of his career as part of his theoretical search for constructive alternatives to the inhibiting and enframing qualities of the disciplinary discourse networks explored in his influential, earlier works. Drawing upon the classical model of self-development, it suggests how individuals can take responsibility and autonomy back from the powerful social frameworks that surround them. Against the grain of the predominantly optimistic values underlying care of the self, however, the critical perspective adopted in this paper sees it as not only an essentially reactive concept formulated as a

response to the over-arching power of dominant social systems, but also a reactive concept that is then additionally susceptible to co-optation by that dominant system. Put in the particular context of FS/OS, whilst it may nominally appear that developing software skills in one's own time represents an empowering, technologized form of care of the self, when those skills are pre-emptively suited to the needs of capitalism, any empowerment is essentially Pyrrhic. This basic criticism can be extended to a range of overly Panglossian interpretations of the allegedly beneficial aspects of the information society. These cyber-optimistic works either celebrate the informationalized impetus of new communications technologies as innately positive (Lash 2002, Jenkins 2006, Poster 2006) or propose a profound recalibration of traditional socialist thought (Hardt and Negri 2000, 2005). After a brief account of Foucault's particularly socio-technical understanding of technology, we explore in detail how, contra such theoretical optimism, the FS/OS phenomenon may in fact represent merely a more subtly invasive form of dis-empowerment. Although Foucault still hoped for empowering potential in his notion of care for the self, our more critical account suggests this optimism was perhaps misplaced.

For Foucault there are four key types of technologies:

1. technologies of production
2. technologies of sign systems
3. technologies of power
4. technologies of the self

Foucault describes how technologies of the self: 'permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality' (Foucault in Blaikie 2003: 109). He goes on to argue that:

These four types of technologies hardly ever function separately, although each one of them is associated with a certain type of domination. Each implies certain modes of training and modification of individuals, not only in the obvious sense of acquiring certain skills but also in the sense of acquiring certain attitudes. I wanted to show both their specific nature and their constant interaction. For instance, one sees the relation between manipulating things and domination in Karl Marx's *Capital*, where every technique of production requires modification of individual conduct, not only skills, but also attitudes (*Ibid.*).

FS/OS discussions tend to focus upon the specific skills being gained but not upon their interaction

with their wider social context. If Foucault's use of Marx is taken further we can see how the traditional interaction of production/domination within capitalism has given way with the advent of FS/OS to a more complex ideological sleight of hand. Creativity as a skill is subtly blended with community values, to produce a self that still works for capital by manipulation but less obviously so because the domination aspects that were formerly part of this productive relationship are now obscured by the ideological role played by the new nominally 'sexy' creativity/community dyad.

Whilst Foucault argues that the above four types of technology rarely operate separately, it can be argued that it is the rise of the information society that makes any relative distinctions between the orders much more difficult to observe. For example, the attitude of domination that Marx identified as a result of the pervasive power of capitalism's materially productive techniques is much more obviously discernible than the more opaque ways in which the four technological orders become imbricated in the im/material world of the digital. For example, also citing Marx and drawing upon Deleuze, Hardt and Negri (2000) suggest that his evocative image of the subterranean revolutionary mole needs, in an informational age, to be altered to that of an undulating snake that traverses the surface of our newly informationalized society (whilst Lefebvre [1991] similarly formulates a conception of new, innovative spider-like interactions with space). From a critical perspective, the various zoological innovations to Marx's humble mole of which Hardt and Negri's serpent, is but one example, represent an intellectual version of the proverbial attempt to make a silk purse out of a sow's ear. As is common in neo-Marxist applications of the Deleuzian rhizome, they purport to see a root and branch (so to speak) virtue in new connective possibilities in the conflict between capital and its workers. Unfortunately, these possibilities in that remain defined in frustratingly vague terms.

We argue that the novelty of information technologies and the qualitatively different environments they engender should not distract theorists from the ultimately dis-empowering nature of the information society's carefully cultured immateriality. It is not Luddite, but rather more politically responsible, to oppose the currently widespread embracing of immateriality in order to promote closer attention to the precise nature of the interrelationship of the material and the immaterial - the im/material. Concentrating upon the essential tension of the im/material both avoids the common tendency to fetishize information technology as innately liberating and as providing a more theoretical sensitivity to the suspicion that erstwhile anti-capitalist and predominantly positive interpretations of the information society's possibilities for empowerment are in fact misguidedly still reinforcing the capitalist project. As Žižek puts it, "The target of critique here involves those aspects of Deleuzianism that, while masquerading as radical chic, effectively transform Deleuze into an ideologist of today's "digital capitalism" ' (Žižek 2004: xii). Likewise, the more critical elements of Foucault's technology of the self risk a possible passing over in favour of unjustifiably optimistic interpretations.

Foucault himself speculated that: 'Perhaps I've insisted too much in the technology of domination and power. I am more and more interested in the interaction between oneself and others and in the technologies of individual domination, the history of how an individual acts upon himself, in the technology of self' (Foucault in Blaikie 2003: 110). However, we extract more critical implications from this theoretical distinction between a general technological environment of domination and the notion of individual self-domination, than Foucault does. In his technologies of the self, subjects create/produce themselves as they interact with the various systems of power and discourses within society, but despite acknowledging (via Marx) the causal interrelationship between the two realms of domination, the immediately preceding quotation involves a degree of what might be termed "verbal slippage" between individual domination understood as a negative phenomenon arising from predominantly external sources (that may then be internalized) and domination of the self as a positive development now subordinated under the term 'care of the self'. This raises an important ideological question as to the extent to which the traditional Marxian notion of domination still exists but is increasingly obscured within the information society by an emphasis upon individual domination - unjustifiably re-framed as an empowering phenomenon.

Overtly oppressive systems readily appear as imposed from the top, a danger of Foucault's care of the self applied to FS/OS is creation of the worst of all possible scenarios whereby the oppression of the individual is essentially privatized, as the responsibility for economic viability becomes one's own on-going life-problem. In this context, FS/OS becomes a structuring technology of the individual that seamlessly reproduces capitalist values in the subject whilst simultaneously creating the misapprehension that a non- or even an anti-capitalist agenda is being sought. Capitalist values are thus generated from within, as individuals naturally interact in a new discursive environment of OS production that is only superficially open when in fact the true discursive realm is innately framed and pre-ordained with commodified values. A critical analysis of this naturalizing process can be conceptualized using Foucault's own theoretical frameworks - the construction of culture-defining epistemes. It is also reminiscent of Barthes's previously cited notion of mythology as a realm of bourgeois meaning that misleadingly 'goes without saying' and Deleuze's 'image of thought' as a set of unquestioned philosophical presuppositions. We suggest that, whilst originally conceived as a mode of thinking with which to avoid conventional social power structures, Foucault's technologies of the self require added reinforcement from more critical notions in order to maintain a strong focus on the relationship between an individual's tendency to self-regulate/dominate and an overarching capitalist environment of technological domination that creates this tendency in the first place.

The Production of Self in the Knowledge Based Economy

...the future of humankind will become more dependent on the equitable production, distribution, and use of knowledge than ever before (UNESCO 1999).

The above assertion was made by UNESCO experts at the World Conference on Science in 1999. From the previously explored Foucauldian perspective, both this and Rose's related conception of the production or invention of self (1990, 1996) are highly significant. They refer to the tendency within knowledge economies for workers to have increasing responsibility not just for contributing to the organizational output of profitable commodities, but to also ensure and improve their own place in the capitalist system through sustainable self-trained employability and subordination to this system. In this situation, both Marx's *commodity fetishism* whereby objects assume social relations whilst people assume objectified relations and Lukács's (1968 [1922]) related notion of *reification* in which the commodity becomes a society-defining entity, become extended to their (il)logical conclusion - people are now their own commodities and they are responsible for their own training, marketing and subsequent saleability. Consequently, vexed questions about agency and power relations within knowledge production still occur even in what purport to be radical, 'non-profit' production environments.

It is therefore important to emphasize how FS/OS as a new mode of production does not escape the pressures for conformity of international norms toward what are now seen to be 'employable' skills. One irony is that within the FS/OS community, a large percentage of participants are not employed but in fact, aim to become employ-able through this informal training ground for knowledge production. Several developers affirm that their participation in these communities is a 'privilege'. This situation is reminiscent of Gorz's comments that in the post-Fordist world, we are expected to feel fortunate and even lucky to find paid employment, and the job interview becomes a type of audition wherein the subject is expected to perform or entertain (Gorz 1999). It is also reminiscent of the description in *Neuromancer*, William Gibson's novel responsible for popularizing the concept of cyberspace, of an urban environment known as 'Night City', an exciting but Darwinian site of social struggle which the fictional uber-capitalist powers-that-be had created as 'a deliberately unsupervised playground for technology itself' (1984: 11). Similarly and more prosaically, despite its radical rhetoric, FS/OS also risks becoming merely a training and/or playground fostered by capitalism for the unemployed or those who aim to remain employable, a site that serves to prepare the intellectual labour power needed for the existing monopolies of the software market. Employable 'knowledge' and skills have been reassessed during nations' skills revolutions. But production lies at the core of any economic system, and the role of knowledge in hegemonic struggles within the workplace has become particularly relevant within what the management literature have come to call the global knowledge based economy.

For some, the burgeoning information economy has 'furthered significant trends in the international division of labour, rather than redirected them' (May 2002: 326). But here, we look at the

changing understanding of knowledge in a relatively new production model - the community-based model, as well as the impact this transformation has had on workers' survival and workers' very employability within the global economy. A key argument is that whilst the KBE undoubtedly creates flux-ridden, rapidly changing environments, the full impact upon individuals tends to be glossed over in favour of celebrations of abstract conceptualizations of information-induced change as an end in itself. Factors that need to be considered more closely include the potential of these new sites to become the focal points of newly contested interpretations of what knowledge is, and how it should be produced, with much fuller consideration given to new inter-subjectivities between workers and between workers and capital. Although workers' activity is specifically linked to the production of knowledge, much of the organisational psychology and education literature applauds very specific types of activities as being the most rewarding. However, uncritical assumptions are frequently made that this set of skills benefits the software industry at large beyond any direct contribution to the Microsoft empire, with a further uncritical commitment to the innately ideological idea that individuals no longer benefit from lifetime employment, but the opportunity to enjoy improved *employability*. Tensions emerge from these assumptions that must be understood if we are to support the idea that participation in community-based models such as FS/OS in fact, does liberate workers who have been subordinated to capital and through exploitative class relations throughout history.

Class relations are decisive in defining societies as 'capitalist', but there is a need for a better understanding of the exact relations involved in the struggles between owners of the means of production and workers in contemporary global politics at an intensified level of abstraction and at a time when owners may appear to have become the workers themselves in such environments as FS/OS. Perelman (1998) and Kletke, Ammons and Ellis (1996) show that in the information age it is increasingly problematic to rely on traditional images of class, because roles are blurred and salaries do not always match skills or status in the same manner as occurred within industrial capitalism. We need to re-conceptualise social relations to understand the re-formation of connections between knowledge, production processes, and value. In particular, the value of labour is increasingly difficult to measure quantitatively with the developments of technology and with the transformation of firm relations, when workers are thrown onto a completely new playing field. Demands on labour and conditions of production have a tendency to change rapidly and unpredictably and thus become more difficult to contest. Workers are cast from the labour process in economic crises, and find themselves in the situation of re-entering the labour market and having to accommodate new structures of production after being told their redundancies were inevitable. The instability of the market in the information age 'dispels all fixity and security in the situation of the labourer... it constantly threatens, by taking away the instruments of labour, to snatch from his hands his means of subsistence, and by suppressing his detail function, to make him superfluous' (Marx 1999 [1887]: 292). Though Marx was writing about the

'Modern Industry', and the 'social character inherent in its capitalistic form', these ideas can be transposed onto a contemporary moment in production. Markets do not operate independently of people's behaviour, and the management of institutions that operate within, and determine the conditions of the market need to be clarified and understood for a better understanding of changes to the lives of both workers and the unemployed in the new economy.

Perfect Rationality or Perfect Accidents? Participation within the Open Source Communities

A primary commodity in agricultural economies was land. This was to some extent replaced by capital and labour during the industrialisation of economies. Within the KBE, knowledge has become the primary sought commodity, but its tradeable characteristics are not as clear as previous objects for trade, and thus its production becomes a contested arena. Perhaps this is why 'control' has become an increasing dilemma for studies of the workplace. 'Control by machine' was proposed with the development of information technology and service sector occupations, but ideas for workplace discipline have expanded. Skills, knowledge, and innovation have become competitive resources for employability. To remain *employable* in a knowledge economy, workers need to adapt to an entirely new set of codes involved in the production, mediation, and application of knowledge. Work in the KBE appears to offer several unprecedented promises for life fulfilment and self governance, and appeals to human nature are common in the KBE employment literature to the extent that autonomy is now seamlessly integrated into profit-making and what is presented as perfect economic rationality. The word 'autonomy' comes from two Greek words for 'self' and 'rule' and the ideology of self-rule suffuses knowledge-producing work environments. Recently, strategies for management control have increasingly emphasized the 'mind-power and subjectivities of employees' which, if managed correctly, will result in corporate 'excellence' as well as personal fulfilment. In this fashion, appeals to self-improvement and fulfilment no longer fundamentally contradict the tenets of surplus-value extracting capitalism.

The ownership of intangible goods and services and the knowledge involved in their production drives competition in the 'new capitalism'. Workplace requirements have become less directly 'trainable' because the outcome is less obviously measured, so the OS community becomes an attractive arena for self-development and preparation for re-entry into the market. While this is heralded as a triumphant moment in history for the emancipation of the worker, because the production of intangible goods within these industries requires new learning capabilities and skills, without an obvious route for training of these within the private sector, workers are being forced to take a new level of responsibility for individual welfare that was historically part of the responsibility of the State. Demands upon workers' skills were traditionally materially identified around what were considered immutably formed market structures, but in the KBE the means of production includes less

measurable, intangible requirements for participation. Workers are increasingly expected to take ownership of their own employability, or toward the 'ability' to gain, maintain, and obtain employment within post-industrial conditions. The question is whether this shift will cultivate an arena within which workers can take control of the labour process, and whether it will eliminate discrimination and power relations within the workforce. Politicians across the globe, the management literature, and employers preach what sounds almost revolutionary, in what is called 'the promise', a promise implying that this shift will indeed offer workers a new dimension to work freedoms and ownership.

To shed light on the motivations of software developers for joining the OS community, a report from Ghosh (et al) in 2002 from the International Institute of Infonomics University of Maastrich, shows that participants tend to be young and predominantly male, well educated and single. FS/OS developers earn a significantly lower wage than those working for the hegemonic companies such as Microsoft and IBM. 7 per cent earn nothing, and 45 per cent earn no more than 2000 EUROS monthly (Ghosh et al 2002: 14). From the online survey of 2784 OS and Free Software developers, the study found that this type of software production is treated as more of a hobby than a salaried occupation, but that almost 8 out of 10 developers or 78.9 per cent join OS communities with the intention to learn and practice new skills, and 29.8 per cent stay in OS to specifically improve job opportunities. But 52 per cent of participants develop proprietary software as well as OS products, and 65 per cent are employed full time anyway, so it seems that this originally ideologically driven 'political movement' has not established a clearly defined contestation toward capitalist models of production. Participants are still faced with the fundamental question of income, but even this is becoming less of an issue for OS developers, because 'a lot of money can be earned by the development or application of OS/FS, like it illustrated by the example of LINUX' (*Ibid.* 44-5).

Participants are varied in their chosen reasons for participation, but incentives typically depend on the assumption of human creativity and innovation which are now themselves defined as *skill* in today's climate of employability. Behavioural psychologists have historically led the way in analyses of creative knowledge creation but more recently, sociologists and management specialists have begun to consider creativity and membership of the 'creative class' (Florida 2002, 2004) as important for workers' knowledge production capabilities and thus for employability, but still limit the final outcomes of creative thinking to assessment within an unwritten curricula for how these skills can be acquired. Furthermore, organisational theorists have analysed management and workers' learning processes with the implicit intention to improve production, by way of the theory of communities of practice (Lave and Wenger 1991) which is a specific interpretation of social learning theory which suggests that learning takes place in social contexts beyond formal schooling and training, particularly within occupational communities and the workplace. Within management studies from around the 1980s, andragogy often takes the place of pedagogy (Fox 2000), save examples such as the removing the metaphorical instructor from production sites altogether, but critics show that workers' creative output

seldom becomes self beneficial, except for the retention of employment or in the contemporary moment - *the acquisition of employability*.

Drucker believes that knowledge workers have become owners of the means of production and the tools of production likewise and will thus find personal fulfilment. But in community-based models for production, the basic incentive of wages does not exist. Learning-oriented microsocieties such as OS are portrayed within the apologist management literature as a kind of utopia, or an 'edutopia' within which individuals are free to find individual satisfaction and empowerment. When juxtaposed to Marx's critiques of the exploitation of the value of labour power in the material sense, it becomes unclear how to identify power relations that historically have occurred between capitalists and workers within what are now knowledge based models of production. The new composition of creative gurus are a type of organic intellectuals in the Gramscian sense. They are in control of the design and perpetuation of hegemonic knowledge through a particular ideological consent that appears to be emancipatory, but becomes gradually a part of everyday life and consciousness that is *as* restrictive as any previous power relation necessary for the perpetuation of competitive capitalism.

Employers have begun to look for talent, individuality, innovation, entrepreneurship, and overall for 'knowledge, skills and commitment of employees as a source of efficiency, innovation and productivity' (Brown et al 2003: 110). While workers have always been expected to become socialised into their environments, this process has become a learning process without a material curriculum or even a promise for human sustenance. The most 'potent' knowledge is meant to come from tacit learning, which is differentiated from explicit knowledge. The formation of knowledge and innovation is the basis for communities with undefined parameters for production, but the human liberties this pursuit apparently offers somehow overlook a guarantee for participants' gain in any way except to become employable in the world that Free Software advocates claim can be transcended. But perhaps most importantly, knowledge production in OS communities requires creativity.

Scientific analyses of creative processes stems from the 1960s with psychologists who referenced late 19th century authors to explore the idea of creative thought in comparison to other knowledge processes. Donald Campbell (1960) noted the conditions for general inductive gain, which involves a process of the evolution of mechanisms for introducing variation, added to consistent selection processes, which finally was expected to reveal a mechanism for reproducing and preserving selected variants emerging from the former conditions. So the general plan of knowledge production is blind-variation-and-selective-retention. Creative thought, on the other hand, requires 'substitute exploration of a substitute representation of the environment' (1960: 384) by way of a substituted exploratory thought process. This author cites Bain in this discussion of trials and errors for theorisation of the accurate and successful process termination, or the 'aha-erlebnis' of a final idea. Bain condones

originality, emotion, adventurism and energetic character traits for the success of creative thinking. The action of creativity is understood generally as the creation of an idea, whereas innovation is a more complex concept. A group of researchers at the Institute of Work Psychology, University of Sheffield, critique their own discipline for advancing the generation of ideas without examining their implementation, which requires an extended range of skills and most importantly, innovation. Employee role orientation and self-efficacy are linked to innovation, which itself requires 'approval, support and resources of others', although assumptions of individualism and rationality lie at the core of skills and production capacities.

But this line of reasoning still relies on unwritten curricula and on the epistemological 'truths' of positivism that determine and design measures for success. Workplace expectations for knowledge production are becoming normalised within the KBE and rely on employability of workers, revealing contradictions within this transformation. If employability is dependent on the accidental circumstances that must be instigated by workers' energetic trial and error, how can potential employees possibly defend themselves and their abilities in a meaningful sense, or in a way that protects jobs and job security, much less the unpaid participants in OS? Furthermore, these authors rely on the assumption that the process as a whole externally provides "foresight" for overt behaviour; otherwise, the results could not be measured for success as the production of truly 'new' thought. It is thus appropriate to look at the production of knowledge regarding what makes employees employable and an investigation of the value ascribed to knowledge produced in the workplace from the CPE perspective, which allows for a critique rather than a reification of understandings. If OS is a site for the attainment of employability, then does it succeed in creating an alternative economic imaginary? Or is it a re-invention, indeed a redemption of the capitalist mode of production?

Toward a Conclusion

Hesketh and Brown (2004: 1 - 13) discuss the 'war for talent' within the knowledge based economy, showing that companies are battling for employees who can offer the kinds of skills and learning abilities that workers acquire through participation in community-based models of production such as the one discussed here. This talent war however reveals a considerable paradox because recruitment has become less dependent on the actual 'knowledge' of candidates but depends on a range of factors that do not even reflect the learning acquisition in the pool of potentially employable workers. In fact, this paradox is not due to the lessening importance of knowledge, but has occurred because the candidate

pool is becoming increasingly educated to the University level. Students at higher levels of education have increased fourfold in the West since the 1960s, making selection for employment a rapidly changing playing field. So employability has become dependent on a managerial 'science of gut feeling', combined with applicants' reputational and social capital, and OS is an ideal location within the IT sector to develop this capital. This is an important claim as job markets across the world are becoming increasingly unstable, and flexibility is becoming increasingly accepted as the norm.

Wheeler (2007) discusses the superiority of OS models by comparing them to models within which proprietary software is produced. First, when community members come across bugs, or defects, in software, they actively root them out rather than to simply report them. The second advantage is peer review within communities which would not be available within closed circuits of development. Third, meritocracy appears to be a necessary element to the success of projects, which is related to peer review. Fourth, projects in the community-based model are not restricted to timelines to the extent that a firm would impose, allowing for ongoing beta testing. But this praise ignores the new pressures on developers themselves to become and remain core contributors, who are predicted to 'have market opportunities that conventional software developers would not have. If you've contributed to a software system used by millions of people, you've demonstrated something that most software developers have not done' (Festa 2004) leading to participants' further employability. Volunteering for OS projects 'can be an effective way to get a job', and serve as a recruiting ground for potential employers as well.

Outside of ethical considerations for participation in OS, Raymond (1999) predicts a positive future for OS because the closed source 'world' cannot win against OS communities in an 'evolutionary arms race' because OS produces knowledge, skill and human capital, providing the time and space to develop a personal vocational portfolio. It is a form of self-funded training that demonstrates our original claim that FS/OS appears to fulfil a role that perhaps should be played by this sector's organic intellectuals and management with appropriate remuneration, rather than the usage of unpaid labour power. Even the leaders in the software market have begun to pay earnest attention to FS/OS, such as IBM who hired Apache and its FS/OS developers to produce and sell its software because it became clear that in many cases, FS/OS produces better software than its Goliath competitors. The ascendancy of FS/OS in a market that once was impenetrable shows the power of critical social movements, but rather than conceding to an economic imaginary of the emancipated, we encourage FS/OS advocates to think about whether it provides a revolutionary model for production. The danger is that it in fact acts as a consortium for pre-existing capitalist models organised during industrialisation by the way in which it substitutes skills development sites in place of welfare state provisions for the promotion of employability rather than employment. Further research should look at the spatio-temporal link

between this historical post-dot.com bubble period and the introduction of unpaid production circles, in the emerging scenario of surplus skilled labour.

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ⁱ This is a reference to Eric Raymond's paper and later book *The Cathedral and The Bazaar* (1999) about the development of the Linux kernel.

ⁱⁱ The term 'andragogy' was developed by Malcolm Knowles (1975, 1984) who claimed that the methodology, method or theory surrounding education of children cannot be the same as those used for adults. Andragogy reduces the role for a teacher/educator and encourages self-directed learning.