

Old wine, new bottles and the Internet

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ABSTRACT

The Internet has given a new shape to modern capitalism. These new features have drawn the attention of numerous scholars and have become the focus of highly topical and controversial questions. However, as a rule, the literature has not taken as its starting point the development of a Marxist epistemology. The reason for this is the failure to derive a Marxist theory of knowledge from Marx's value theory. This is the task this article sets itself. The first section conceptualises mental versus objective labour processes and rejects the notion of the non-materiality of knowledge. The second section builds on this conceptualisation and deals with three interrelated questions, namely whether mental labour can produce value and surplus value and whether the distinctions on the one hand between productive and unproductive labour and on the other between production and consumption retain their validity in mental production. The third section explores the class nature of knowledge with particular reference to the Internet. Some final considerations follow in the last section.

Some elements of a Marxist epistemology¹

Consider labour. It is a transformative process, that is, a sequence of transformations. These can be of two types: objective transformations and mental transformations.

Objective transformations transform objective reality, reality that exists outside of our perception, even if we need to perceive it in order to transform it. More precisely:

$$(1) OT = L \rightarrow (MO, OO) = ON$$

where OT is objective transformations whose outcome is ON, the new objective use values, or output; L is labour power; MO are the objective means of objective transformations (e.g. a hammer); and OO is the objective objects of objective transformations (e.g. marble). The symbol \rightarrow indicates transformations. L transforms the terms within parentheses. The outcome is ON.

In mental transformations, labour power transforms its own knowledge and therefore

1 For a more complete analysis see Carchedi, 2012, chapters 1 and 4. See also Carchedi, 2005.

itself. This is why KL appears in both parentheses, both the transforming and the transformed elements. Labour power also transforms the knowledge contained in objective reality (e.g. books or computers) into new knowledge:

$$(2) MT = (L, KL) \rightarrow (KL, KO) = KN$$

where MT is mental transformations whose outcome is new knowledge, KN. KL is the knowledge existing in labour power and KO is the knowledge contained in objective sources of knowledge (books, computers) outside KL. KL is both the mental means of mental transformations and one of the two mental objects of mental transformation (it transforms itself), the other one being KO. KL as one of the inputs of a mental transformation is not the same as its output, KN, because KN is the outcome of the combination of L, KL, and KO (the inputs). Since KN is immediately incorporated into KL, KN as the output of one MT becomes immediately the KL of the next mental transformation.²

It would be mistaken to consider mental transformations as 'immaterial'. Both objective and mental transformations are material. In fact, both require the expenditure of human energy, which is material, as shown by human metabolism. More specifically, the expenditure of human energy that constitutes the cognitive process, thinking, causes a change in the nervous system, in the interconnections between the neurons of the brain. This is called synopsis. It is these changes that make possible a different perception of the world. Knowledge, even if intangible, is thus material. To deny this means to ignore the results of neuroscience. After all, if electricity and its effects are material, why should the electrical activity of the brain and its effects (knowledge) not also be material? There is no 'immaterial' labour, *pace* the workerist authors.³ But of course, while synapses make possible (changed) perceptions of the world, what is perceived is eminently social; it is the myriad social relations and processes in all their infinite manifestations constituting a society. *Knowledge is always both material and social.*

The question of the (im)materiality of knowledge is of the utmost importance for value theory.⁴ If knowledge were immaterial, its production could not produce something material, value. Since it is material, it can produce value and surplus value. But under what conditions?

Transformations are transformations of use values. In (1) the use values that are transformed are *objective use values*, M^o and O^o . In (2) the use values that are transformed are *mental use values*: the use value of specific forms of knowledge; the use to which a form of knowledge lends itself. The mental use values transformed by labour power are K^l and K^o .

The distinction between the two types of transformations is only analytical because in reality objective transformations require mental transformations and vice versa. However, this distinction is necessary to conceptualise the labour process and thus labour. A labour process is always the transformation of use values, both objective and mental. But it is

2 This is the temporalist approach whose application solves the so-called transformation problem. See Carchedi, 1984, 2001 and 2012.

3 A complete critique of workerism is beyond the scope of this work. See Carchedi, 2012; Henninger, 2007, Starosta, 2012. For some authors, especially of a workerist persuasion, the notion of 'immaterial' seems to resemble that of 'mental' in this work. Even so, the gulf is unbridgeable because workerism rejects Marx's labour theory of value while the present work retains it and builds a Marxist epistemology upon it.

4 And, as we shall see, class determined.

either objective or mental according to which type of transformation is determinant. The relation of determination would require a detailed analysis.⁵ Here suffice it to mention that to be determinant means to be the condition of existence of the determined instance and to be determined means to be the condition of reproduction or supersession of the determinant instance. Then, the objective labour process is:

$$(3) \text{ OLP} = (\text{OT} \Rightarrow \text{MT}) = \text{ON}$$

where ON, the objective product, is the result of the objective labour process (OLP), the interaction of objective and mental transformations in which the former determine the latter. It is thus mistaken to think that objective labour, sometimes called physical or manual or material labour, is separated from mental activity.⁶

In the mental labour process (MLP), the mental transformations are determinant:

$$(4) \text{ MLP} = (\text{MT} \Rightarrow \text{OT}) = \text{KN}$$

where KN is new knowledge. KN has been considered to be the outcome only of mental transformations, as in (2) above, only as a first approximation. In reality, KN is the outcome of a mental labour process that requires both mental and objective transformations. For example, the production of a video game (MLP) requires an objective transformation, say the transformation of white paper into printed paper through a printer. The printer is an objective means of objective transformations. But within the context of an MLP, it is also an objective means of a mental labour process, a condition for the (re)production of that form of knowledge, the video game.

Three points follow from this. First, knowledge as an input of the MLP is not the output of that process.⁷ Second, new knowledge is not necessarily different knowledge. It is knowledge produced anew, even if it is a replica of an old one. Third, the key to distinguish an objective from a mental labour process is whether in general it is used for its objective content (e.g. a shoe) or its mental content (e.g. a book).

Value and the Internet

The social determination of the Internet as a web of computers and as a technique of treating information is well known: it originated in the Cold War.⁸ Generally speaking, this is not the focus of dispute. Rather, the controversy hinges upon whether Marx's value theory is still valid under modern conditions. Two preliminary points should be made.

First, within capitalism, the labour process (either mental or objective) is one of two aspects of the *production process*, the other one being the *surplus value producing process*, or exploitation. This latter means that labourers must transform objective or mental use values for a time longer than that necessary for the production of their socially determined means of objective or mental consumption. Thus, a part of the

5 See Carchedi, 2012, especially chapter 1.

6 Rey (2012:406) is one of many holding this view.

7 There is no circularity but a succession of MLPs. This is different from the view that 'Information is circular, in the sense that it is both input and output . . . therefore it becomes very difficult to distinguish production, distribution and consumption of information.' (Kostakis, 2012: 2). This comes very close to arguing that information is both the input and the output of the same MLP, a mistake made by a great number of authors, Marxist and non-Marxist alike, especially when dealing with the transformation of values into prices.

8 See e.g. Denton, P.H. & S. Restivo (2008:160-171).

working day must be used to produce objective or mental use values for the capitalists. To this end, labourers must be forced to deliver surplus labour by those agents who, as Marx says in vol. III of *Capital*, perform the *function of capital* (or work of control and surveillance) without being capitalists, without being the owners of the means of objective or mental production.⁹ If labourers internalise the desirability of providing surplus labour, they internalise the function of capital. As we shall see, nowadays this latter option is more easily applicable to certain types of mental labourers, also on the Internet.

Second, in dealing with the Internet, we should distinguish between three categories of *mental producers*, those who I have referred to above, as a first approximation, mental labourers.

The first of these categories consists of those mental producers who use the Internet to work for capital. They are the *mental labourers* proper.

The second consists of those mental producers who use the Internet for profit without being capitalists. They are the *mental self-employed*. They will not be dealt with here both for reasons of space and because they are the debris originating from the collision between the two basic classes.

The third category consists of those mental producers who use the Internet for other purposes (for recreation, education, research, etc.) while not working for capital, but in their own free time. I refer to this group as *mental agents*, the producers of knowledge free from the rule of capital.¹⁰ It is important to keep in mind the distinction between mental labourers and mental agents, since this distinction is essential to review the three questions debated in the literature.

Do mental labourers on the Internet produce surplus value?

The first question is *whether mental labourers on the Internet produce value*. Since value is labour expended under the capitalist production relation (by labour for capital), the production of knowledge (mental labour) can be productive of value and surplus value because it is mental labour performed for capital. In this case, the quantity of new value generated during the mental labour process is given by the length and intensity of the abstract mental labour performed, given the value of the labour power of the mental labourers. Exploitation, then, is the difference between the value of the mental labourers' labour power and the value they generate. This value might be incorporated in an objective shell or not. In both cases it is an intangible but material commodity whose value is determined by the quantity of mental labour needed to produce it.¹¹

Besides these general features, mental production on the Internet has its own specificities, namely new labour processes, new positions, and new forms of exploitation. But these specificities do not cancel their capitalist nature. Let us take the example of a new labour process studied by Legault (Legault, 2013:84): the production

9 The notion of ownership of the means of mental production will be dealt with further down.

10 In the literature they are referred to as users. But they are not simply users. They are producers of knowledge. They use, consume, pre-existing knowledge as an input of the process of mental production.

11 As Pfeiffer correctly remarks, 'in the present state of research, no clear and conclusive statement can be made that the source of value creation has actually changed.' (2013: 19).

of video games.¹² Since each video game is a unique piece and the technologies change rapidly, some of the personnel are highly skilled; but not all of them. Capital stamps the structure of the labour process by creating a bureaucratic hierarchy that includes more as well as less qualified tasks. The function of capital as brute external coercion, as in the Tayloristic assembly line, is ill suited for the control of the personnel whose labour relies on their relatively spontaneous creativity. In this case, new ways to control labour are necessary. The capitalists, through the supervisors (project managers), see to it that their labourers complete their tasks within the time allocated to them. Project managers monitor the developers' progress and pay them when the project has reached some important points (milestones). The labourers are controlled by project managers who have internalised the aims and rationality of capital. But within these limits, labourers are free to take their own decisions and set their pace of work. Control has changed semblance. But this neither cancels exploitation nor frees labour from capital's rule.

Thus, the greater autonomy of these highly qualified mental labourers is far from being absolute. Flexible and intellectually and emotionally rewarding labour hides long working hours, long and frequent hours of unpaid overtime (Legault, 2013:79) and the maximisation of labour intensity (Pitts, 2013:102). Terranova (2000) refers to America Online (AOL) as an 'electronic sweatshop' Moreover, these positions are subjected to tendential dequalification.¹³ It is not only, as Pitts aptly puts it, 'disciplined autonomy' (Pitts, 2013:101). It is also creativity moulded by capital. Capital pays labourers to be creative, but this creativity must be consonant with capital's aims and not with the labourers' full and all-round development.

New divisions of tasks emerge. For example, some of the labourers working for search engines analyse blogs, both quantitatively in terms of the number of visitors, and qualitatively in terms of the comments left by the visitors and thus in terms of their ideas, preferences, etc. Other labourers navigate the web looking for ideas helpful for advertising campaigns, for example by analysing chat lines. Still others transform this material into a commodity to be sold to advertising agencies.

Some commentators have emphasised another aspect: the blurring of the frontier between working time and private life. For example, labourers solve 'creative problems' regarding their jobs in their free time (Pitts, 2013:95). Or, labourers can answer emails or keep up their correspondence with bloggers from home, also in their free time. The question is whether this labour is productive of value. If capital is a relation of production, this relation is *suspended* in the labourer's free time and *resumed* when the labourers return to their work. In the time they work at home they do not produce *value* because during this time they are not paid by capital. Rather, they produce *use values*. When they return to their work, it is as if they answered those emails in the

12 For a thorough analysis of the production of video games see Dyer-Witford & de Peute, 2009. This is a valuable work, in spite of its reliance on the workerist perspective, in that it highlights the interaction of virtual games and the social context within which they are developed.

13 As an anonymous referee has remarked, 'Initially ... software developers could partly pursue non-economic goals such as actually writing the best software for a certain problem (focus on use values). With growing competition this is no longer the case: now they have to find a solution that ... creates the lowest costs (focus on exchange values).'

first instant of their work. It is as if they worked more intensely. The capitalists increase their profits because of that increased intensity. It follows that the extra surplus value must be appropriated from the competitors through the price mechanism.

Critics hold that the productivity of mental production cannot be measured. But consider first objective production. Productivity is measured as units of output per unit of capital invested. This holds also for mental production, say, a video game. Consider first the numerator. The mental product can be contained in a physical shell (a DVD). The DVDs produced can be counted as units of output. But the videogame can also be downloaded from one computer to another. The number of downloads can also be counted. They, too, are units of output. In short, the mental output can be counted because it is material. This is the numerator.

As for the denominator, consider first the capital invested in the *prototype*. This is not only fixed constant capital (computers, premises, facilities, chips foundries, assembly plants, etc.). It is also circulating constant capital (raw materials) and variable capital (wages). Then there is the capital invested in administration, pre-sale advertising and other costs. Let us call all this capital (a).

Secondly, there is the capital invested in the production and sale of the *replicas* of the prototype. This is the capital of type (a) for the production and delivery of the replicas plus the capital of type (a) for the sale of the product (e.g. advertising) during the whole life cycle of the mental labour process. Let us call the capital needed for the production and sale of the replicas (b). The total capital invested is thus (a) plus (b). This is the denominator of productivity ratio. Productivity in mental production can be computed.

Another related misconception is that the unit value of the copies is or tends (practically) to zero. In reality, the *total* value of the replicas is given by (a) plus (b) plus (c) where (c) is the surplus value generated during the whole life cycle of the mental labour process. The *unit* value is then given by the total value divided by the number of replicas made. It is directly proportional to the total value and inversely proportional to the quantity of the replicas. Then, the capital invested in the prototype is spread over an increasing number of replicas. Let us assume for the sake of argument that it is or tends towards zero. But the capital invested in the production and sale of the replicas plus the surplus value generated increase as the output increases. The unit value does not tend towards zero, *pace* the costless reproducibility of the workerist 'cognitive commodity'.

The size of this mental output is variable. It depends on the technology used. Its limit is obsolescence, a point reached when, due to intense competition, its demand falls to the point at which it is not profitable any longer to produce it. In the sectors with intense competition, as in the video games sector, this causes a high rate of business failures. If production stops when the receipts are less than the capital invested, a loss is suffered. If production continues after that point, profits are made.

What are the alternatives submitted by the critics of the application of the labour theory of value to the production of knowledge? Let us take two examples. For Jodi Dean (2010), 'Just as industrial capitalism relied on the exploitation of labor, so does communicative capitalism rely on the exploitation of communication.' In this approach, communication is reified. The point is that communication is

knowledge and knowledge is the product of mental labour. Thus the exploitation of communication is simply the exploitation of the mental labourers' (abstract) mental labour.

For Arvidsson and Colleoni (2012), Marx's value theory is not applicable to the Internet. For these authors, value is the affective attachment to a commodity, to a brand. Presumably, the greater the number of customers attached to a brand (and thus buying that product), the greater its value. This is the view of the capitalists who aim at maximising their share of the market by manipulating demand, i.e. by influencing the redistribution of value. But before it can be redistributed, value must be produced. The source of value and thus of surplus value remains unexplained. Therefore this approach is useless as an economic theory. For example, the authors fail to explain how the (dis)accumulation of affective investments can explain, say, economic crises.

The above calls for some short remarks on so-called affective labour, i.e. labour that produces or manipulates affects (wrongly referred to as 'immaterial labour'). Here I am not referring to housework, which is not performed for capital and thus must be the object of a separate analysis. Rather, I mean the kinds of labour that some Autonomist authors describe as 'affective': advertising, care work, the jobs of flight attendants, fast food workers, etc. All these categories can be easily accommodated within the law of value. Advertising is an example of unproductive mental labour. Care work is an example of objective productive labour because it preserves and reconstitutes the commodity labour power (which is material). Flight attendants are an element of transportation (which for Marx is both objective and productive of value) and thus their labour is both objective and productive. And fast food workers are also productive labourers whose objective product is sold by the capitalists to customers for profit. As for friendly sales staff, whose sales figures are better than those of their less friendly colleagues, they are more skilled (whether their friendliness is a character trait or learned) and thus more efficient. Their labour power thus has a higher value. But they are unproductive workers and thus do not produce value. Through their greater efficiency and thus their higher sales, they make it possible for the commercial capitalists to appropriate more surplus value from other capitalists.

The distinction between productive and unproductive labour

The *second question* concerns the distinction between productive and unproductive labour, which is supposedly invalid in mental production and especially on the Internet.

Let us first begin with objective labour. For Marx, labour immersed in the capitalist production relation is productive if it transforms use values into new use values. It is thus unproductive in the following four cases. First, labour employed in commerce. As Marx argues, while productive labour transforms objective use values, unproductive labour deals with them without transforming them. If one exchanges objective use values, one cannot transform them. Second, labour employed in finance and speculation. This is unproductive because it does not deal at all with objective use values. Third, there are those who perform the work of control and surveillance, the function of capital. They can be called 'non-labourers'. The fact that they are necessary

for the capitalist production process does not make them productive of value. They cannot produce value because one cannot transform use values if one forces others to perform that transformation.¹⁴ Finally, the labour that destroys objective use values cannot be productive of value because it destroys the specific form (use values) in which value is contained.

Similarly, the production of knowledge by mental labourers is productive of value because it transforms mental use values. But on the basis of the above, it is not productive of value if it theorises: (a) the exchange of objective use values; (b) financing and speculation; (c) the performance of the function of capital; and (d) the destruction of objective use values.¹⁵ The question is not whether the generation of knowledge *tout court* is productive or not.¹⁶ The question is when it is and when it is not. The distinction between productive and unproductive mental labourers also holds if they operate through the Internet.

Let us now look at the *mental agents*.¹⁷ They, too, are unproductive, but for a different reason, because they are not employed by capital. Consider, for example, the 'social buttons' on Facebook. The mental agents who click on social buttons ('Like', 'Share', and so on), or who discuss a variety of issues on blogs, or who develop technological innovations through their interaction, transform mental use values. At the same time, they provide knowledge to whoever is interested in it. This knowledge is free, not because it costs nothing (think of the wear and tear on the computer, of the energy consumed, etc.) but because anybody can appropriate it free of charge. On the Internet, this is what the search engines, a specific form of capitalist mental production, do through their mental labourers.¹⁸ They transform this knowledge into marketable knowledge, i.e. they quantify data on tastes, desires, interests, etc. Then they sell this data to other capitalists who use it to plan advertising campaigns and investments, to evaluate the credit-worthiness of clients, and so on. Those capitalists that are more skilful in appropriating the knowledge generated by the mental agents (so-called users) can thereby increase their profitability. This is a new form of inter-capitalist competition that will probably become more important in the years to come.

Or consider the case of mental agents contributing voluntarily to open-source (OS) projects through the Internet. Since they are not employed by capital, they are unproductive. They enjoy great freedom to apply their creativity. But the individual contributions might require coordination and thus a more or less formal organisation. This coordination can be the task of the project initiator or of those programmers with particular skills and commitment to the project. They decide which contributions to accept and give form and direction to the project. Wikipedia is a case in point.

The coordinators are often employed by IT firms. And thus they are productive.

14 Some mental producers can perform alternatively productive labour and the function of capital. See Carchedi, 1977.

15 See Carchedi, 2012: 220-225.

16 Ross (2013) is one of many holding this view.

17 For Kostakis (2012: 6) 'users produce value for firms.' For Reveley (2013) users are not producers of value. Users generate data passively and unconsciously (515), and are not 'primary producers' (516).

18 This is also what some blogs do. See Geert Lovink, *Ossessioni collettive*, Milan: Università Bocconi Editore, 2011: 22.

Who gains in this case? The knowledge so produced can either be appropriated by the firm 'lending' the coordinators or be free, in the sense that any other capitalist can appropriate it. In the former case, the advantage is obvious. By paying only one mental labourer (the coordinator), that firm appropriates the mental agents' collective knowledge and turns it into a source of profit.

But the firm can 'lend' a coordinator to a mental labour process without retaining the exclusive ownership of that knowledge. This apparent paradox is explained by a series of advantages accruing to the firms 'lending' mental labourers to this common project. First, the coordinator can accept only those contributions that fit that firm's techniques and interests. Second, that firm reckons that its advantages from such knowledge are greater than those accruing to its competitors. Third, by observing through the coordinator how the mental agents can be controlled and managed, that firm can draw useful indications as to how to control and manage its own mental labourers.

Some authors (Fuchs, 2010) deny that mental agents are unproductive and, following in the footsteps of workerism, extend the notion of exploitation beyond waged labour and into the whole of society. They argue that, since all labour is a condition for the reproduction of capital and thus for the production of surplus value, all labour is productive and capital exploits all members of society, non-stop. Two objections can be mentioned. First, to be the condition for the production of value is not the same as producing value. Collapsing the condition of production into actual production leads to absurd results. Since all labour is also a condition for the destruction of capital (crises, wars, etc.) all labour would also be destruction of capital. Second, if all labour is productive, why should capital try to increase the time that labourers work for it and reduce the labourers' free time?

Fuchs holds also that, given that Internet users (mental agents) are not paid for the production of value, the value of their labour power is nil. Thus, all the value produced by them should be regarded as surplus value that goes to capital. The rate of surplus value is thus infinite (Fuchs, 2010). But then, how can something that has no value (labour power) produce value and surplus value? And if all value were surplus value, the users *as* users would have to live on air.¹⁹

In reality, capital pays labourers for supplying labour for, say, eight hours per day. If the rate of exploitation is 100%, four hours are necessary to produce the wage goods (and thus to reconstitute the labour force for 24 hours) and 4 hours are surplus labour producing surplus product and thus surplus value. The reconstitution of labour power also implies recreation activities, including those on the Internet for, say, one hour a day. The same person who is a mental labourer for eight hours is a mental agent on the Internet for one hour, in her/his free time. Since in that hour that mental agent does not work for capital, s/he is not exploited and does not produce value and surplus value. The question of mental agents' rate of exploitation is thus meaningless. That mental producer is exploited not as a mental agent but as a mental labourer.

19 See also Henninger, 2007

The distinction between production and consumption

The third and final question concerns the *distinction between production and consumption* that the Internet is supposed to have made obsolete. This argument rests on a new figure, the so-called *prosumer*.²⁰ This term refers to mental agents whose production of knowledge co-determines the characteristics of an objective commodity that they commission through the Internet and then purchase and consume. The knowledge produced by that mental agent enters into and shapes the capitalist's objective production process, for example in the production of custom-made shoes. That mental agent participates in the design of the objective output: the shoes that this 'prosumer' subsequently purchases. However, it is one thing to argue that the same person is both a producer of a mental use value and consumer of an objective output; it is another to hold that the distinction between production and consumption has disappeared. Time is the key.

The knowledge produced by the mental agent is a mental use value that enters into and shapes the mental transformations determined by the capitalist's objective production process. The mental agent's consumption of the output of the capitalist's objective production process follows its production temporally. The present mental producer (mental agent) is the future consumer. The two phases are temporally distinct even if the same person might be a mental producer today and an objective consumer tomorrow. The prosumer thesis errs in that it cancels time. The prosumer is a figure of virtual reality, not of real reality.

The above is not to deny that 'users', i.e. mental agents, are the source of innovations in many fields (Lakhani & Wolf, 2005; Banks & Deuze, 2009; Prahalad & Ramaswamy, 2000). But behind the hype, the truth of the matter is that mental agents are a new source of productivity for corporations (Pralhad & Ramaswamy, 2000). An example of this is modding, the modification of video games by consumers (mental agents) using the tools provided by the manufacturers of the games. They are 'an increasingly important source of value for the games industry' (Kücklich, 2005). The character behind the Janus face of the prosumer is not the empowered consumer but capital with new techniques to increase efficiency, sales, and profitability at no cost.²¹ The idea that this new technology might replace mass production should be taken with a good dose of scepticism given that the future consumer brings only (marginal) modifications to mass produced commodities. 'In 2011 ... the Internet economy only contribute[d] 3.8% of the GDP of the EU27' (Pfeiffer, 2013:15).

Class knowledge and the Internet

The essence of capitalism is the contradiction between two fundamental classes: the owners and the non-owners of the means of production, and thus between the generators and the appropriators of surplus value. This contradiction also emerges at the level of cognition. The ownership of the means of production and thus the appropriation of surplus value require a view of reality that rationalises exploitation, inequality, and

20 See Rey, 2012, but also a host of other authors.

21 Or at the cost of its 'creative professionals', i.e. skilled mental labourers, inasmuch as the 'prosumers' replace them. See Banks and Deuze, 2009.

egoism. This is *capital's rationality*. Labour, to rid itself of capital's yoke, must express the opposite rationality. *Labour's rationality* must be based on co-operation, solidarity, and equality. The capitalists, to be such, must produce, or allow to be produced, a variety of views of reality whose common feature is that of being moulded by capital's rationality. The labourers, to resist capital's rule, must generate alternative views of reality with an opposite class content. Of course, there are more classes and many groups within them. But focus only on the two main classes is sufficient for the present purposes.

How can classes, aggregations of individuals who are by definition different, generate a knowledge shared by a number of individuals? How can social knowledge arise? The process of cognition involves two movements. They are contemporaneous but will be mentioned successively for the sake of exposition. The first movement is from classes to individuals.

For the system to reproduce itself, there must be individuals who rationalise its reproduction, no matter how. The capitalists, to be such, must rationalise, or allow to be rationalised, in a variety of ways, their own contribution to the production of wealth (value) in the form of profits. And there must also be individuals who rationalise, or allow to be rationalised, no matter how, resistance against the system and thus profits as the appropriation by the capitalists of a share of the value produced by labourers. The difference is that, as we shall see in a short while, mental labourers must work with the means of mental production owned by capital. Their resistance remains within the limits circumscribed by capital. Their cognition can transcend those limits only when they are free from capital's mental domination.

At this stage of the exposition, the specific features of these rationalisations are still undetermined. However, since classes are aggregations of individuals, these pro-capital and pro-labour rationalisations can exist and become manifest only in and through individuals, i.e. through specific, unique individual conceptualisations. Then, in principle, each individual internalises in his or her own way the rationality and interests of the class to which he or she belongs. But, through interaction with other individuals as carriers of other, opposite rationalities and interests, each individual can internalise different and opposite rationalities and interests. Thus, individuals give their own specific form to conflicting rationalities. Some of these cognitions can be consistent with, and some can be opposite to, the interests and rationality of the class to which an individual belongs objectively. The outcome is a kaleidoscope of depictions of reality, each with its own contradictory class content.

The class determination of knowledge holds at the aggregate, class, level because there must always be capitalists who conceptualise reality through the prism of capital's rationality and labourers who see the world through labour's rationality. But individual forms of knowledge are internally contradictory to the point at which a labourer's consciousness can either contain exclusively capital's rationality or be determined by that rationality. Who expresses one or the other rationality is a matter of chance. Social determination in one realm of reality (the system's need to express opposite types of rationality) manifests itself as a number of chance events in another realm of reality, that of concrete individuals and, vice versa, chance events in one realm of reality (that of the individuals) manifest themselves as social regularities in another realm (that of social

classes). It is thus meaningless to seek a perfect match between a Weberian definition of class and individual class-consciousness.²²

The second movement is from individuals back to classes. Individual forms of consciousness aggregate into views shared by a class. Since the elements of the aggregation are internally contradictory, and possibly mutually contradictory, the outcome of the aggregation is also contradictory. Moreover, given the internally contradictory nature of individual views, there are many aggregations that rationalise, each in its own way, the interests of a class. The process of cognition involves the clash of rationalities both between and within classes. These aggregations are not the simple summation of individual forms of consciousness because these specific manifestations are by definition different and thus cannot be added. There must be a common element that makes that aggregation possible. This is their shared class content irrespective of who shares it. This is why classes can reproduce themselves independently of which specific individuals, and thus which specific individual forms of consciousness, share that class content. There is no cognitive neutral space.

The aggregation of individual forms of knowledge requires the aggregation of mental producers who, following Gramsci, are here called organic intellectuals.²³ The organic intellectuals transform the variety of the specific individual forms of knowledge of the members of a group into their own view. Their representations become their individual, personal interpretation of a collective knowledge; they become the specific forms of a generality. The organic intellectuals and those they represent form the collective intellect of that group, the collective subjectivity, or knowledge, of that group.²⁴ Given the constant interaction between the organic intellectual and the other members of that group, the collective knowledge of that group is the product of the collective intellect and not only of the organic intellectuals. The organic intellectuals contribute and give a unified shape to that collective knowledge. Thus nothing could be further from the truth than that the collective subjectivity cancels individual identity.

Within a group there can emerge more than one organic intellectual. Each has a different interpretation of that group's knowledge and each vies to become dominant. Also, within a group there might be sub-groups. Each can be represented by one or more organic intellectuals who operate at a lower level of aggregating capacity. Thus the collective intellect of a group can result from the interaction of the collective intellects of the several sub-groups. But this is not all. The organic intellectual of a group interacts with the general intellect and thus with the organic intellectuals of other groups. An organic intellectual can interiorise elements of a collective knowledge from a different class perspective until the original collective knowledge undergoes a radical change. The continuous struggle between these two rationalities to become dominant within each and all forms of knowledge is the cognitive class struggle: class struggle as production of knowledge.

22 Erik Olin Wright (1989) is the prominent sociologist who has worked with this methodology within a Marxist perspective. For a detailed critique, see Carchedi, 1989.

23 Differently from Gramsci, here the organic intellectual aggregates the view and represents the interests of any social group.

24 This has nothing to do with the workerist notion of general intellect which generates knowledge through a mysterious, because never analysed, collective process of mental production.

As far as labour is concerned, this means that the defence and fostering of labour's rationality can assume different forms according to who becomes its intellectual representatives and that the capacity of its collective intellects to ward off capitals' rationality depends not only on the collective intellects' intellectual capacities but also, and mainly, on the interrelation between the multifarious forms of manifestation of all societal relations and processes both expressing and influencing the class struggle (e.g. the upwards or downwards long-term economic phase, the political power relations, the nature of labour's institutions and organisations from the smallest to the biggest, like the trade unions, etc.) and thus on the knowledge of the nature of that struggle.

If we apply the notion of the class content of knowledge to the analysis of the mental labour process (MLP) as above, the class content of knowledge as an output of an MLP is determined by the class content of the knowledge that goes into its generation. Then the analysis of how the social content of the knowledge as output derives from the social content of the knowledge as input implies the analysis of the social content of input. Since the input of one period is the output of the previous period, don't we fall into a backwards *ad infinitum* trap? No. The social content of knowledge as output can be determined independently of the social content of knowledge as input. But what if we want to understand how the input affects the output?

Let us choose a point of departure, for example time t_1 as the end point of the period t_0 - t_1 . This period produces new knowledge, call it $K^N(t_1)$.²⁵ At t_1 we can analyse the social content of $K^N(t_1)$ but not that of its mental input, the knowledge contained at t_0 in labour power, i.e. $K^L(t_0)$. The next production period, t_1 - t_2 , produces $K^N(t_2)$. Its input is $K^N(t_1)$, the output of the previous period, the social content of which is known. Since the output of a period becomes the input of the following period, $K^N(t_1)$ as output of t_0 - t_1 is at the same time $K^L(t_1)$, the input of t_2 - t_2 . Then we can analyse how $K^L(t_1)$ determines the social content of $K^N(t_2)$. From t_2 on, we can follow how the social contents of the mental inputs determine the social content of the newly generated knowledge.²⁶

The thesis of the class determination of knowledge is rejected even by many Marxists, certainly when it comes to natural sciences. It is its use, it is held, and not its nature that is socially-determined, ie class-determined. Yet it is undeniable that, if the system must continue to exist in a contradictory way, there must be individuals who internalise class-determined cognitions. Then, their aggregations into shared cognitions, in other words the production of social knowledge, must be class-determined before that social knowledge can be used by one or the other class, or by both.

To clarify, let me consider two of the critics' favourite examples. First, a gun is supposed to be class neutral because both classes can use it. But a gun is the product of a society based on violence, in the last instance on the repression of labour by capital. Ultimately, it serves a class-determined need, the need of capital to continue to exploit

25 For the symbols KN, KL, and KO, refer back to relation (2) above. For the sake of simplicity, KO is disregarded.

26 The same procedure allows us to answer the regression *ad infinitum* in the so-called transformation problem. See Carchedi, 2012.

labour and thus to reproduce itself. If a gun is used by labour, it serves the equally class-determined need of labour to resist exploitation. There is thus a *double* class determination, rather than no class determination. Its double class determination is inherent in its production because that production is the expression of a society divided between capital and labour. Thus the use of the gun by both classes is due to the gun's double class determination rather than it not being class determined.

The production of the gun determines the mental labour needed for that production. So if that objective production and its outcome are class determined, the mental labour they determine is also determined by capital's need to exploit labour. If the gun is used by labour to resist exploitation, the mental labour conceptualising that resistance is determined by labour's equally class-determined need to resist exploitation. An important conclusion follows: if knowledge is class determined, *all its constitutive elements are also class determined*. This conclusion is valid also for $2+2=4$, another of the critics' favourite examples.

The critics hold that $2+2$ is always equal to 4 in all societies and for all classes. Thus, $2+2=4$ cannot be class determined. But first of all, $2+2$ is *not* always equal to 4. It all depends on what we want to measure and on how we measure it. For example, our system of recording the time of the day goes from 0 to 24. Then, $23+1$ is both $= 24$ and $= 0$ so that $24+2$ is not 26 but 2. In mathematics, this is expressed as $26 \equiv 2$, *modulo* 24. Or consider clocks that use the numerals from 0 to 12. Then, $12 = 0$ and $10+6 \equiv 4$, *modulo* 12, and not 16. Or consider a numerical system going from 0 to 4. Then $2+2 \equiv 0$, *modulo* 4. But once we choose a *modulo*, e.g. *modulo* 24, $2+2$ is always equal to 4. What, then, can be said about its its social determination and content?

Primitive people did not conceptualise $2+2=4$. They used expressions such as 'many people'. Numerical systems, and thus presumably $2+2 = 4$, were determined by the emergence of exchange and commerce. As societies developed, the class determination of $2+2=4$ changed. The need arose for different societies and different classes to measure and quantify irrespective of what is being measured and quantified. This need was and is common to contradictory rationalities. But this is not to say that it is not class determined. On the contrary, it is determined by more than one class because it is needed by more than one class to express forms of knowledge with a specific class determination and content. This I call 'multiple determination'. The specificity of multiple determination is that, in order to be consistent with opposite rationalities, it must be pure form without a visible class content. This holds for $2+2=4$ as well as more generally for mathematics.

The critics perceive multiple determination, i.e. determination by more than one society or by more than one class, as lack of class determination. In so doing, they make a two-fold mistake. First, for them class determination implies necessarily the determination by only one class. They ignore multiple determination. Second, they fail to notice that if multiple determination abstracts from specific determinations, it does not erase them. They continue to exist potentially, hidden by multiple determination. This is why a specific determination, i.e. by only one class, can emerge again when that knowledge is immersed in a specific mental labour process. In other words, $2+2 = 4$ is determined by capital or by labour, and thus acquires its pro-capital or pro-labour class

content, according to whether it is an element of a mental labour process informed basically by capital's or by labour's rationality. Far from not being class determined, $2+2=4$ is at the same time determined both by more than one class (as a multiple determination, as a pure form) and specifically by only one class, when it becomes an element of a specific mental labour process.

The above has dealt with the production of knowledge in general under capitalism. Consider now MLPs carried out by mental labourers working for capital. They must transform existing knowledge into new knowledge with means of mental production owned by capital. What does this mean? The capitalists own the mental labourers' labour power. Consequently, the capitalists can decide which knowledge should be produced, how it should be produced, and for whom. Or, they have the power to define and solve problems (or let them be defined and solved) for their own goals, i.e. according to their own rationality. It is in this sense that they own the mental means of mental transformations which are also the means of mental production (KL in relation 2 above). It follows that the knowledge their mental labours produce must be informed either only by capital's rationality or also by labour's rationality. In the latter case, labour's rationality can become realised only within the contours of capital's rationality, and thus, only shaped and thus denatured by it.²⁷ As we shall see, labour's rationality can enter the production of this knowledge but only because it is denatured by capital's rationality. This is cognitive class struggle. Labour's false consciousness is not a distorted reflection of reality but the acceptance by labour of capital's rationality.

Usually, capitalists do not have the competence needed to organise and manage an MLP. This is the task of the collective intellect at their service. Within it, the organic intellectuals plan the structure of the MLP and formulate the tasks of the rest of the collective intellect and thus the structure of the MLP. This structure is fragmented in such a way that the collective intellect cannot reconstruct the overall view of the labour process. The structure of the production of knowledge by labour under capitalism is thus an instrument of labour's domination by capital. This is the hierarchical structure analysed first by Marx and in more recent times discussed in the Braverman debate. But there is also a different form of labour process, an MLP in which mental labourers are free to express their creativity subject to the ultimate approval and coordination of an agent of capital, for example a coordinator. The hierarchy is reduced to a minimum, but it is still there to ensure that these labourers produce surplus value. To this end, the organic intellectuals must have internalised the aims of capital and must have made them their own.

There is a feature specific to the production of knowledge under the rule of capital. In objective production, capital appropriates the product (and thus the value and surplus value contained in it) and nothing remains to labour. In mental production, capital owns the means of mental production and thus it appropriates the outcome of that process.²⁸ But that knowledge is also retained by the collective intellect. Capital appropriates the original, as it were, and the copy remains with labour. Then, the

27 The capitalists can pursue their own goals also indirectly, by defending the specific collective interests of those social groups in whose collective knowledge capital's rationality is dominant.

28 'The accumulation of knowledge and skill, of the general productive forces of the social brain [are] absorbed into capital.' Marx, 1973: 694.

collective intellect can use the copy of the knowledge it produces for its own purposes, and is thus also to resist the rule of capital.

However, capital's rationality predominates over labour's rationality because that knowledge has been produced by mental labourers with capital's means of mental production. Labour can use it to resist capital's rule but that resistance remains within the contours of capital's rule. For example, the rhythm of the assembly line can only be slowed down. Or, as we have seen, the use of a gun both by capital and by labour is not due to the class neutrality of the knowledge needed for its production but to its double class determination.²⁹ Labour can and must use it to resist capital's domination, but at the same time it acknowledges and accepts capital's rationality: the use of violence. Or take the knowledge needed for cooperation within a team of workers. The rules are not those that maximise the development of the workers' potentialities or the power to challenge capital's domination but those that increase productivity and thus profitability. Solidarity as viewed by labour has been transformed into a weapon of capitalist domination. Pharmaceutical firms do not produce those medicines that maximise human well-being but those that maximise profits.

Let us now come to the production of knowledge on the Internet. If it is produced by mental labourers, the analysis above applies. This explains the pro-capital knowledge inherent, for example, in video games.³⁰ If it is produced by mental agents, since it is not produced within the capitalist (mental production) relation, it can have a contradictory social content in which labour's rationality can (but does not necessarily) predominate. The generation of knowledge on the Internet is a battle for knowledge. It is part of the wider cognitive class struggle, between capital's and labour's rationality in its multifarious and ever-changing forms of manifestation. This knowledge, then, can be used to resist capital's rule. This is the real importance of the Internet.

The delusions of 'cognitive capitalism'

The apologetic analyses of the Internet are strictly connected to the notion of 'information society' and 'cognitive capitalism'. These are highly ideological concepts. The usual meaning of information is that it is communication of operational knowledge. In this view, information has no class content. This notion reflects and reproduces the myth of the class neutrality of knowledge. This is why in this essay I have used the term 'knowledge' rather than 'information'. The concept of cognitive society is equally ideological. As Henninger (2007) points out, the imagery of cognitive society is the way 'certain relatively privileged sectors of the world's working population' perceive contemporary capitalism. Even if, for the sake of argument, all objective labour processes were to disappear worldwide and only mental labourers were left, the old and debilitating features of capitalism would re-emerge, even if in a new guise. I consider only a few examples here.

29 This raises the issue of the role of non-violence in labour's strategy. This issue is beyond the scope of this article.

30 Dyer-Witheford and de Peute (2009) provide an excellent analysis of the ideological nature of virtual games. However, this study is embedded in a workerist frame, an approach radically different from that followed in this work.

On the Internet some mental labourers, e.g. some programmers in IT firms, can and must use their creativity to solve conceptual problems. This is a psychologically rewarding activity, often well paid. However, far from being a prefiguration of the working class of the future, they could be considered to be a new form of labour aristocracy. As such, in spite of their privileges, they are subjected to the rule of capital. They must apply their creativity (highly-skilled labour) also in their (mostly unpaid) free time. The skills they are under pressure to develop are those that can be used by capital, i.e. their conceptions are informed by capital's rationality. Their employment is subject to the ebb and flow of the economic cycle. As in objective labour processes, newly created highly-skilled positions are under constant threat of dequalification. A new form of proletarianisation emerges. The following passages are illuminating

Mechanical Turk is the innovation behind 'crowdworking', the low-wage virtual labor phenomenon that has reinvented piecework for the digital age. Created by Amazon in 2005, it remains one of the central platforms – markets, really – where crowd-based labor is bought and sold. As many as 500,000 'crowdworkers' power the Mechanical Turk machine, while millions more (no one knows how many exactly) fuel competitor sites like CrowdFlower, Clickworker, CloudCrowd and dozens of smaller ones. On any given day, at any given minute, these workers perform millions of tiny tasks for companies both vast (think Twitter) and humble. Though few of these people have any sense of their finished work product, what they're doing is helping to power the parts of the Internet that most of us take for granted.

As CrowdFlower's Biewald told an audience of young tech types in 2010, in a moment of unchecked bluntness: 'Before the Internet, it would be really difficult to find someone, sit them down for ten minutes and get them to work for you, and then fire them after those ten minutes. But with technology, you can actually find them, pay them the tiny amount of money, and then get rid of them when you don't need them anymore.' (Marvit, 2014)

The rate of exploitation of crowdworkers can be even higher than that in many objective production processes (whether they are aware of it or not). As Marvit (2014) says in discussing crowdwork, 'Since 2005, Amazon has helped create one of the most exploited workforces one has ever seen.'

The knowledge generated by mental agents can also be shaped by capitalist rationality. This is the case with projects that rest on the contribution of a number of mental agents. A large number of them aim at being hired by capital. The skills they develop must then be suited to the needs of capital. The freedom of their creativity and their much-touted 'playbour' is thus constrained. But, inasmuch as their mental production is not influenced by capital's rationality, they can generate a type of knowledge whose class content is alternative to that of capital. An example is provided by the thirteen-minute political documentary *The French Democracy* on the uprising by immigrant youth in 2005 in the suburbs of Paris. This video 'made for a cost of some \$60, was downloaded many times, for free, was uploaded to YouTube, drew widespread press attention, and was shown at film festivals, making it perhaps the

single most effective communiqué from the banlieues to leap across the Atlantic and around the world.' (Dyer-Witheford & de Peuter, 2009:187).

The case studies reviewed in this work have highlighted specific novelties. Those novelties are new bottles containing old wine: capitalism and its double, contradictory rationality. This thesis is further and definitely supported if we look at the wider picture. In the words of the *Economist*:

The prosperity unleashed by the digital revolution has gone overwhelmingly to the owners of capital and the highest-skilled workers. Over the past three decades, labour's share of output has shrunk globally from 64% to 59%. Meanwhile, the share of income going to the top 1% in America has risen from around 9% in the 1970s to 22% today. Unemployment is at alarming levels in much of the rich world, and not just for cyclical reasons. In 2000, 65% of working-age Americans were in work; since then the proportion has fallen, during good years as well as bad, to the current level of 59%. (Economist, 2014).

This is exactly what Marx would have predicted. What the *Economist* forgets to mention is that in the last 30 years cognitive capitalism has been plagued by a series of crises, each worse than the one before. And, after 15 years of explosive growth of the Internet known as Web 2.0, the world economy has never been in such a bad shape since the 1929–33 crisis.

Contemporary sociological literature has generated a host of examples of how mental agents' interactions through the Internet and the forms of knowledge springing from these interactions, provide glimpses of a social structure based on labour's rationality as well as specific forms of resistance to capital's rule. But it would be a dangerous illusion to think that a simple multiplication of these attempts can lead to a radical societal change if the capitalist production relation is not thrown into the dustbin of history. The Internet does not cancel the divide between capital and labour and thus does not change the law of value. The theory of knowledge built upon the law of value rests on sound foundations. This theory can help us to understand how the Internet provides a global arena where specific form of knowledge arise, interact, and attempt to change each other, i.e. how the Internet reshapes the multitude of the cognitive forms of manifestation of the capital/labour contradiction. These forms of knowledge can be productive of value if produced under the rule of capitalism. To analyse them, one need not discard Marx's value theory. It is sufficient to apply it.
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