

A critical assessment on the potentialities and limitations of a Marxian-informed approach to teaching/learning activities

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Abstract

Bourgeois-based approaches to ‘critical thinking’ are failing to help students develop self-reflexivity and the capacity to think critically about the world. This circumstance has led some Marxist authors to claim that dialectics is the real form of critical thinking, so it should be introduced into teaching/learning activities. This advocacy for dialectical thinking has not been translated thus far into concrete course programmes or syllabi that help understand how such a Marxian-informed approach to education might be worked out, nor do these authors have systematically reflected on the potentialities and limitations that the embedment of dialectics into teaching may bear. This paper addresses both aspects in the light of a particular case study—the design and implementation of a course in Science Communication for graduates that has the theoretical and methodological foundations of the Critique of Political Economy as its basis. It thus outlines the contours of the study programme of that course; comments on what are the material bases on which this proposal finds its conditions of existence, and, relatedly, what are the advantages that this Marxian-inspired perspective vis-à-vis other approaches to ‘critical thinking’; and theorises on whether it is possible to unpack the full potential of dialectical thought within the boundaries of capitalist education. The enquiry concludes that, insofar as the capital-form is a fetter for the development of the productive forces of society, it impinges

on any Marxian-informed approach to teaching/learning activities in several ways.

Keywords: Marxism, dialectics, science communication, education, capitalism.

1. Introduction

Critical thinking is nowadays integrated into almost every course programme and syllabi, for academics are expected to elicit higher-order cognitive processes among students (Layanage, Walker & Shokouhi, 2021). But critical thinking might not be living up to the expectations it once raised, for it seems that the evil that it was purportedly to eradicate—formulaic practice and knowledge memorisation—have again entered into education through the backdoor. Assessment processes and exams make students repeating those behaviours expected from them, rather than thinking critically about their own practice in and beyond the classroom (Layanage, Walker & Shokouhi, 2021). Furthermore, the form by which critical thinking is taught largely relies on teaching students about *discrete abilities* that can be transferred from one context to another, whereby the inner connection between the subject and object of the knowing activity asserts itself once again (Ross & Gautreaux, 2018).

From a Marxian perspective, these difficulties come as no surprise, particularly given that contemporary approaches to teaching and education, even those that adopt a more critical perspective, are nevertheless underpinned by a bourgeois worldview, with the isolated, egoistic individual at its centre (Pavlidis, 2015). Along with these ideological traits goes the very *social function* performed by education in capitalism, for education and training are located into the broader process of producing labour-power (Rikowski, 1997). Arguably, it already impinges on the possibilities for critical thinking to thrive, given that the education that people receive is ultimately determined by capital's needs and

not by theirs (Pavlidis, 2012). If critical education appears not to be providing what it was expected to deliver—human emancipation—, the capitalist mode of production should be blamed, for education is also stamped with the very same antagonistic characters that beset capitalism (Azeri, 2020; Pavlidis, 2015).

In the light of these problems with mainstream approaches to critical thinking and critical education, some Marxist scholars from Education studies and related fields have advocated for the organisation and implementation of teaching/learning activities along the principles of Marxism and, particularly, *dialectical thinking* (for instance, Ross & Gautreaux, 2018; Mathison & Ross, 2022, 130). Such proposal is premised on the assumption that dialectics is ‘the most authentic form of the mind’s critical activity’ (Pavlidis, 2010). For these authors, the problems with which critical thinking comes can ultimately be overcome if critical thinking is ‘raised to its concept’, to use Hegelian parlance, through the implementation of dialectical thinking in education encounters.

Regrettably enough, this perspective has fallen short of translating such demand into the design and implementation of courses, teaching programmes or syllabi, etcetera, that take the foundations of the Critique of Political Economy at their bases. Researchers and practitioners alike are thus left without substantive evidence concerning how this approach may be worked out, nor have these scholars critically engaged in debate about whether this perspective can be implemented through formal education *at all*. The claim that educators must and can foster dialectical thinking among students remain uncontested and undisputed, but only because scholarship has not addressed the issue as seriously and thoroughly as, owing its importance for most critical educators and teachers, it deserves.

This paper attempts to fill this gap by discussing the potentialities and limitations of bringing dialectics into educational encounters and teaching/learning processes. This analysis prompts from the attempt made by the author to plan and implement a course in Science Communication (hereinafter, SC) for graduate students that has the theoretical and methodological foundations of the Critique of Political Economy at its basis. The paper thus systematises this experience and tries to draw a few conclusions from it, by setting it against the backdrop of broader discussions concerning the nature and purpose of both dialectical thought and critical education, and also how these two instances reciprocally mediate each other. The research question that guides this theoretical exercise can be formulated as follows: *Is it actually possible to cultivate dialectical thinking in and through the classroom?* Given the relevance that this issue has for every educator and teacher that sees him/herself as a moment of the ‘real movement of reality’ towards communism, it is the expectation of this author that his contribution will spark the necessary debate about a determination of critical thinking and critical education that has remained largely underdeveloped.

The paper is structured as follows: the following section elaborates on the historical conditions that make *necessary* the cultivation of critical thinking in education settings for the reproduction of contemporary capitalistic societies—and, relatedly, expounds on the potential superiority of dialectical thinking (and its teaching) *vis-à-vis* other non-dialectical approaches to critical thinking. Section §3 discusses why a Marxian-inspired approach to the teaching of SC is both apposite and necessary, and introduces to the reader the programme of a course in SC that the author currently imparts and that builds upon the theoretical and methodological foundations of the Critique of Political Economy. This experience foregrounds in concrete terms the subsequent elaboration on whether a veritably critical education, i.e., an education premised

on dialectical thinking, can be realised at all in and through educational arrangements within capitalism. This issue is explored in Section §4. Section §5 recapitulates the main findings of the paper.

2. Dialectical thinking as critical thinking

Education is neither a system nor a social institution, but a *social process* that labour power must pass through in order to develop the skills that capital demands (Rikowski 1997; 2022). Owing to its werewolf appetite of surplus value, capital ceaselessly revolutionises the technique of production, transforming both its objective and its subjective constituent, namely, capitalists (and capital's representatives in the direct process of production) and workers. Education evolves as humans' productive attributes, including workers' need to be re-shaped—it applies for both the technical skills in the narrower sense, and the forms of consciousness of which workers are carriers, the aggregate of self-perception, dispositions and attitudes that human beings mobilise whenever they engage in the production of a use-value of any kind (Starosta, 2016: 229). In fact, the emergence of 'critical thinking' approaches to education can be traced back to America's mid-fifties (Rikowski, 2007), and it is at the same time both an expression and a result of the subtle revolution in the material process of production prompted by the microelectronics revolution.

Problem-solving, self-reflexivity and autonomous thinking¹ have become an asset for most of the contemporary workforce as a result of changes in the material process of production (see Balconi, 2002; Adler, 2007; Smith & Vidal, 2021; Íñigo, 2020). Therefore, the drift towards 'critical thinking' in the realm of pedagogy and education is not fortuitous; it has to do with a *productive necessity*. Capital has brought about this drift towards critical thinking and the need for education to facilitate the acquisition of the ability to think critically—

and this owes to the never-ending capital's pursuit of augmenting the quantity of surplus labour exploited to the working class.

Memorising and rote learning were the evils of education that critical thinking purportedly aimed at eradicating (Layanage, Walker & Shokouhi, 2021). These abilities may have been necessary in yester times, but they are no longer needed as working processes have become more abstract in nature (Balconi, 2002), and the active intervention of the worker in the production process he/she oversees/is engaged with relies much more on explicit knowledge, complex reasoning and forethought—whereby ‘intellective’ skills replace ‘tacit’ ones (Smith, 2000: 58). However, education based on critical thinking has fallen short of facilitating students the development of those mental capabilities that they are now asked for. Assessment practices and examinations make students focus on the uncritical repetition of those behaviours that are expected from them as ‘critical thinkers’, rather than cultivating critical thinking itself. This is an inescapable problem for capitalistic education. As Pavlidis (2012) argues, externally-given thresholds of performance must be enforced upon students so long as the duration, breadth and, particularly, the social significance of education depends not on the necessities of the student, but on those of capital and capital's representatives. To make things even worse, education in critical thinking ultimately boils down to teaching *discrete sets of skills or abilities* that can be *externally applied* to every situation or to every object of cognition, whereby the acquisition and mastery of these mental tools have nothing whatsoever to do with their deployment (Ross & Gautreaux, 2018) and the classical split between subject of knowledge and object of knowledge that runs through all bourgeois science and philosophy (Azeri, 2020; Lúkas, 1971) asserts itself once again.

As bourgeois-grounded teaching of critical thinking cannot deliver what it promised to do—the ability to grasp the world of phenomena in a critical manner, so as to actively intervene on it, some Marxist scholars have argued that, to be truly critical, critical thinking and education are to be raised to their concept, as Hegel would have it, by embedding *dialectical thinking* into education (see Pavlidis, 2010; 2015; Azeri, 2020; Ross & Gautreaux, 2018). As the argument stands, these authors claim that students would develop a real capacity for grasping the World in a critical manner were they taught how to think dialectically. Humanisation will only reach its heights if dialectical thinking eventually become the general form of social consciousness, for dialectics allow human beings to appropriate the social significance of every single real form, turning it thereby into a tool for action—and such social significance cannot be comprehended at its fullest but with dialectical thinking (Azeri, 2020). Marxist dialectics help transcend appearances and penetrate into the determinants of social reality (Pavlidis, 2010); it subverts ‘the immediate appearance of things in order to recognize them in their now pregnant immediacy’, grasping social reality as a ‘mediated immediacy’ (Bonefeld, 2014, 57).

The upshot of all of this is that, for Marxian authors working in the field of Education and/or Pedagogy, there is no case for getting rid of critical thinking altogether despite its shortcomings. On the contrary, it is a matter of *actualising* it—and that is the task of dialectics, ‘the most authentic form of the mind’s critical activity’ (Pavlidis, 2010). By integrating dialectics into educational arrangements, the former will attest to its superiority *vis-à-vis* any other particular modality of education or pedagogy, to say nothing about bourgeois-inspired critical thinking. This certainly applies to the ‘intrinsic’ goal of education, which amounts to the ‘emancipation of individuals’ (Clarke & Mearman, 2003; Mathison & Ross, 2022). Yet a Marxian-inspired approach to

education or pedagogy can also perform better in what comes to the ‘extrinsic’ goals of education, namely, the production of a saleable workforce (see Clarke & Mearman, 2003; Rikowski, 2007). In order to elucidate whether dialectics can actually help overcome the limitations of current, bourgeois-inspired approaches to critical thinking, a few remarks about what is distinctive of dialectics as a form of reasoning should be made.

2.1. Dialectics as a superior form of critical thinking

Dialectical thinking is not a series of principles or rules of thumb to apply anytime anywhere, as if it stood apart and prior to any process of cognition and, hence, of any *object* of cognition. Dialectic thinking is the *actualisation* in the realm of thinking and human consciousness of the *movement of matter* and, hence, of *real life*. Dialectic thought accompanies the real form that stands as the object of cognition in the course of its self-movement (Marx, 1986).

Dialectics does not impose upon the object of cognition any *external* criterion of movement. On the contrary, the subject grasps his/her object of cognition in the latter’s own inner development of affirmation through self-negation (Starosta, 2016; Íñigo Carrera, 2013). Dialectics do not think *about* a given object or real form. It thinks *within* and *out of* that real form, as Bonefeld (2014) emphasises—the ‘thinker’ and the ‘thinkable’ belong to the very same World; there is no ‘things-in-themselves’ beyond human praxis and cognition. So, dialectics is *not* a logic, nor does it have to resort to any in the search for its criterion of ‘truth’—for it would imply that the ‘truth’ lay not *within* the object itself and its self-transformation, but *outside* the object, furnished by the ‘science or pure reasoning’ or the ‘science of thought abstracted from its object’ (for a devastating critique of logical and representational thinking, see Íñigo Carrera, 2013/2003; the difference between ‘determinate abstractions’ and ‘empirical abstractions’ made by Gunn [1992] is to also to the point here).

There are manifold implications from education that ensue from the very nature of dialectical thinking. To start with, dialectical thought overcomes the divide between ‘know how’ and ‘know that’ which runs through all the bourgeois-inspired approaches to critical thinking and to critical education. In so far as the unity of the knowing process and the results that it yields obtains itself in the case of dialectics, teaching about some knowledge obtained by means of dialectics goes in a pair with the cultivation of dialectical thinking (Pavlidis, 2015).

Furthermore, the embedment of dialectic thinking into teaching/learning processes points towards the potential supersession of the externality between the student and his/her own education and educational achievements (Pavlidis, 2012). Dialectics as a form of reasoning is already anticipating the overriding of the structure of reification prompted by the commodity-form and that permeates and pervades the whole social being (Lúkacs, 1971), so it stands as the harbinger of a novel historical epoch for humankind, one in which the social significance of one’s own education is no longer determined by capital’s werewolf appetite of surplus value.

Dialectics also helps to reconcile the two individuals that are drawn into any individually-mediated process of social cognition, i.e., education. Distinctions between ‘educator’ and ‘educated’ become blurred to the extent that dialectic thinking, because of its very form, is self-critical—any appropriation of prior knowledge and information is always a process of critical reflection about oneself and the positioning of the self in relation to that knowledge (Starosta, 2016). There are no repositories of ‘true’ knowledge as there are no rules or principles to be crammed into students’ brains when it comes to dialectical thought (Azeri, 2020; Mathison & Ross, 2022). Accordingly, dialectics does not set apart an educator that has allegedly come to be knowledgeable and

‘enlightened’, and a student who is not. The educational process becomes then a veritably *collective* effort in which both the learner and the learned collaborate in the process of ‘ascending from abstract to concrete’, as Marx (1986, 38) would have it.

All the previous discussion attests to the fact that dialectics is capable of potentially overcoming all the limitations that current approaches to critical thinking, and to its teaching, are fraught with. So, it is advantageous to educate people on thinking dialectically, to foster dialectical thinking in and through the classroom—at least, in what has to do with the ‘intrinsic’ goal of education stated by Clarke and Mearman (2003). Dialectics is a form of human reasoning that could potentially bring about the emancipation of individuals—the ultimate outcome of a veritably critical education, its most general ‘intrinsic’ objective—for it points *beyond* capitalism. Now, the question arises: *What are the strengths of dialectics in relation to the ‘extrinsic’ goals of education?* For, as Clarke and Mearman (2003) comments on, there is no case for any ‘heterodox’ form of teaching (read here, teaching based on dialectics) should that approach not prove its superiority *vis-à-vis* mainstream ones in what comes to producing a saleable workforce as well, that is to say, in equipping students with the skills, abilities and mindsets that capital requires from them. The next section dwells on this issue at greater length and with a higher degree of concreteness, as it discusses a particular experience with future science communicators. Thus far, it suffices to highlight the following: as it happens with any other form of knowing, dialectics has a history—human history. Dialectics are also a particular expression of a definite ‘human global sensuous practice’ in nature (Goldner, 2001), the actualisation of human practice in the face of definite historical conditions and necessities (Azeri, 2020). Be that as it may, the cultivation of dialectics as critical thinking in education finds its conditions of existence on the on-going socialisation of the labour process and the closer

interconnection of partial operations within each unit of social production and between them all (see Adler, 2007; Smith & Vidal, 2021), along with the progress in the ‘objectification of the intelligence of production’ that the revolution in the instrument of production ceaselessly brings about (Freysenet, 2002, 22-23). These all-objective developments ask for a complete overhauling of the workforce and the skillset it equips, as commented above. Bearing the capacity for reflecting upon oneself and the content of his/her own life existence has become a prime for the worker, as social production increasingly relies on critical thinking. And there is just one, real form of critical thinking—dialectics (Pavlidis, 2010).

3. A Marxian approach to Science Communication education and training

The ‘social conversation around science’ (Bucchi & Trench, 2021) looks very differently nowadays as what it looked like a few decades ago. The transformation that Science Communication has undergone stretches to every single domain. More social subjects have been drawn into the ‘ecology of Science Communication’ (Weingart & Joubert, 2019) and operate at the interface between science and society, attempting to bridge the ‘gap’ between the two (Bensaude-Vincent, 2001). Audiences are now more fragmented and display a whole range of distinct needs and interests when it comes to science and research results—and science communicators must cater for all of them (Dudo & Besley, 2016), so their work has gained in complexity. Another important change goes to the ‘instrument of production’: activities in SC takes place through a multitude of channels and platforms, so science communicators are expected how to use new formats, languages and even narratives for the communication process to be effective. Finally, the content of SC has shifted as well. Insofar as more nature has become more and more ‘human-mediated nature’—larger domains of nature are drawn into the web of human praxis and

transformed by it (Goldner, 2001), SC is more now about society and its relationship with nature than it is about nature itself (Thorpe & Gregory, 2010).

To be an efficient science communicator amounts nowadays to much more than being knowledgeable about scientific matters and natural phenomena. As a matter of fact, the most recent theoretical developments in Science Communication education and training (see Mercer-Mapstone & Kuchel, 2017; Baram-Tsabari and Lewenstein, 2017), despite being far from critical, have already some inkling of the fact that proficiency in SC cannot be attained without appropriating the *social significance* of SC. It means that any training and education in SC should allow the student, at the very least, to develop self-awareness and self-reflexivity about his/her own condition as a science communicator—and critical thinking, hence, dialectical thinking, is actually about facilitating the student to acquire such a capacity.

The former is attested by Baram-Tsabari and Lewenstein's (2017) goals for education in SC. According to these authors, any person who has learned enough about SC 'can apply theories and models related' to SC. Correctly understood, it means that the future science communication must internalise all the riches of World-historical knowledge and social labour (Azeri, 2020) that are concretely related to SC. The action of the new cadres of science communicators actualises all that knowledge and information in the face of new problems and social necessities. Yet it does not suffice to have *knowledge* about SC. *Mastery* over the tools that SC deploys is indispensable. This is again confirmed by Baram-Tsabari and Lewenstein (2017) when they say that proficient science communicators 'make use of appropriate tools to engage in conversations' about science or SC. The point to be made concerning so is that there is nothing that can be turned into a tool for action for humans, be it a conceptual or a material tool, if its social significance has not been apprehended

(Azeri, 2020). Last but not least, any proficient science communicator must think of himself/herself as a science communicator and thereby critically reflect on SC's role in society (see Baram-Tsabari & Lewenstein, 2017).

As argued in Section §2, the veritable form of critical reasoning, the form of reasoning that is truly critical, is actually dialectical thinking—whereby a truly critical education is a Marxist-inspired one that takes dialectics as its basis. And critical thinking has become an indispensable asset for science communicators. That circumstance alone should qualify for building courses and teaching programmes and materials in SC by drawing on the methodological foundations of the Critique of Political Economy. Still, the argument in favour of such an approach has not been exhausted. Up to this point, the discussion concerning critical thinking and critical education has only slightly touched upon what 'society' means and what 'social significance' should students grasp by means of critical thinking. In the emptiness of this abstraction, non-dialectical approaches to critical thinking and non-Marxist approaches to critical education have thrived (for an account of non-Marxist 'critical' approaches to education, see Mathison & Ross, 2022). If 'society' is understood devoid of any concrete content, the 'self-reflexivity' and the 'self-awareness' about their social situation that future science communicators are expected to develop, amount to very much nothing. The point is that for dialectical thinking to meaningfully contribute towards the development of critical thinking among students, 'society' must be grasped in its *historical determinateness*, that is to say, as a *capitalist society*. 'Capital is the power that dominates everything in bourgeois society', so it must be both 'the point of departure and the conclusion' (Marx, 1986, 44) of any teaching activity concerning Science Communication and the role that it plays for the reproduction of contemporary capitalist societies.

It is only by means of dialectical thinking that the historical situatedness of SC as both a *prerequisite* and as a *product* of the capitalist relationship of production can be ascertained. Dialectics is actually the only form of human reasoning that casts light on how the capitalist relationship of production immanently generates the necessity of SC, or putting it otherwise, *why* SC inheres to the capitalist mode of production as such. Along these lines, a Marxian-inspired approach to the teaching/learning of Science Communication attests to the superiority of dialectics vis-à-vis bourgeois forms of thinking (including scientific ones), for dialectical thought ‘is well suited to identifying which institutions, entities and processes are *necessary* (...) *for the continued reproduction* of an object-totality such as the capitalist system’ (Reuten, 2014, 266; our emphasis). SC is actually one of these necessary entities for the reproduction of the capitalist relationship of production, as it shall be seen below.

At this juncture, the paper has thrown into relief that there is a case for building a course in SC along the theoretical and methodological underpinnings of the Critique of Political Economy. The chances for future science communicators to be eventually employed increasingly depend on their capacity for self-reflexivity and self-awareness, for being able to grasp ‘the social content of their own life existence’, as Pavlidis (2015) puts it, by means of critical thinking. And such ‘social content’ refers to the particular function that SC plays for the reproduction of contemporary capitalistic societies, to the *how* and the *why* of SC in its historical determinateness. Once this point has been clarified, the paper introduces to the reader an example of what a Marxist-informed approach to the teaching of SC can consist of. That will also serve as a foothold for the discussion that will come next about the possibilities for cultivating dialectical thinking in and through the classroom, the very research question that guides the whole enquiry.

3.1. A Marxian-informed course in Science Communication

The course in SC for graduate students at the Degree of Journalism has two main pillars: a ‘theoretical’ pillar, delivered through lectures, and a ‘practical’ one,² in which students are expected to become science communicators on their own and, by working in groups, are expected to plan and implement a communications plan for a *real* research project. The following exposition restricts itself to the ‘theoretical pillar’, for it is the one in which the Marxian-inspired perspective that has been adopted here shows up all the more plenty and forcefully.

‘Theoretical’ lectures are organised around the general goal of grasping SC in its *historical determinateness*, the latter being understood in the sense made of it above. So it pretends to set out the organic, necessary connection between SC and the capitalist relationship of production, uncovering both the *what* and the *why* of SC—which is what ultimately any dialectical enquiry is all about (Starosta, 2016, 124-126). The *what* refers to the social function that SC plays for the reproduction of contemporary capitalistic societies; the *why*, in turn, addresses the very problem of SC as a *form*, namely, why SC stands as a presupposition, as well as a result, of the capitalist mode of production.

The analysis on the connection between Science Communication and the capitalist mode of production departs from science as a form of human consciousness, to wit, science as an organic moment of *labour*, the species-being form of life activity for humankind (Íñigo Carrera, 2007, 44). Science is presented as a *superior* form of consciousness to the extent that ‘it shortens the road towards truth’ (Grossman, 2009, 168). Scientific reasoning affords humankind with mastery over all processes that have an effect on its reproduction with the less possible expense of human body. This starting point is advantageous since, on the one hand, it allows to shed light on the eminently

practical nature of science; grasping science as an expression of the active relationship of humankind with nature (cfr. Goldner, 2001, 177-178); and, on the other hand, it evinces that science is a moment of labour, so it is a working activity itself that embodies the same *historical attributes* carried by social labour at a given stage of the development of the productive forces of society (more on this, below).

Once the connection between science and labour is established, the next step goes to unfold how the labouring activity of human beings shapes scientific reasoning—itself a more concrete expression of that labouring activity and the historical conditions in which it takes place. Lectures then address the organic constituents of science, namely, its *content*—what science is for—, its *method*—how human beings have theorised about their own forms of scientific thinking and knowing—and the *social form* under which the production of knowledge takes place—how scientific labour has been carried out throughout the history of the capitalist mode of production. This paper will not dwell on this point further.

As science, understood as a particular form of consciousness, is an inner moment of labour, so is SC an inner moment of the scientific enterprise—SC does not longer stand apart from research, rather, it is pivotal for this working activity get its completion (Bucchi & Trench, 2021). Needless to say, the communication of research results to society at large is underpinned by a natural premise: insofar as labour is a collective enterprise, so is its inner moment of *organising* the labouring activity. The success of a collectively concerted action can be attained only if the knowledge about the object to be transformed is communicated to others. Nonetheless, this is a rather abstract determination that holds true for every mode of production. And the course is however concerned just with SC in its *historical determinacy*, that is to say, we pretend to grasp SC

as a ‘determinate abstraction’ that is ‘the product of given historical conditions and [that] retain full validity only for and within these conditions’ (Marx, 1986, 42).

Students will then be taught that SC situates itself as a precondition for the reproduction of capitalist societies owing to the fact that capital deprives workers from the ‘intellectual potencies of the material process of production’ (Marx, 1986, 366), i.e., science, as they are devoid of the means of production and subsistence. It renders impossible and even *meaningless* for them any *unmediated* engagement with what nevertheless is the outcome of social labour, the offspring of its combination and cooperation in the process of production, viz., science. But there cannot be any labouring activity if those engaging in it do not understand the technical and the social dimensions that are present there—so, the broken unity between science and labour must be reasserted. And this is *what* SC is for, the social function that it performs in capitalist societies: it *mediates* the purposeful consumption (‘personal or productive’, following the distinction made by Marx) of any research statement or unit of knowledge in downstream metabolic activities. Science Communication thus bridges the ‘gap’ between science and society, or better said, between science and labour. And it does so by making any research statement potentially accessible, understandable and exploitable (cfr. Arboledas-Lérida, forthcoming).

In short, SC is not common to all epochs and modes of social production, nor does it constitute a necessity of general societal reproduction on its own, regardless of the specific social relationships of production binding together productive human beings. Rather, it has exclusively to do with the *antagonistic character* taken on by social production under the sway of the capital-form—it exists only within and due to this faulty social relationship of production. As capitalism generates and constantly reproduces the gulf between science and

labour, so it must engender within itself the conditions for overcoming it, something that it can only attain in a *partial, limited* manner. Whereby SC can be seen as a *faux frais* of capitalist production, an unproductive expense on a massive, social scale that human society can dispense with once capitalism has been superseded and whose fate is, accordingly, inextricably interwoven with capital's own transient character. Putting it somewhat controversially, the supersession of capitalism does not involve liberating SC from the yoke of the capital-form, as some suggest (cfr. Bauer, 2008; Thorpe & Gregory, 2010; Thorpe, 2020). Rather, Science Communication must be got rid of altogether.

The remaining of the lectures are devoted to set out how SC endeavours to close the gap that capitalism has engendered, or putting it otherwise, it maps out the particular forms that SC adopts in order to reassert the broken unity between science and labour. This is actually of little interest for the further discussion, so the paper can now move to address whether is it possible at all to unleash and leverage on at full on the *revolutionary* potentialities of dialectical thinking within educational settings and in educational encounters.

4. Education and dialectical thinking

Growing calls for the adoption of Marxian-inspired approaches to teaching/learning activities have not been translated thus far into concrete study programmes, syllabi or educational experiences. So there has not been any substantive debate about the *real* possibilities for dialectics to be cultivated in and through capitalist education; about the chances for a truly critical education, i.e., an education that departs from the Critique of Political Economy and that takes dialectics as its working method (see Mathison & Ross, 2022), to thrive under capitalism. Drawing on the particular experience expounded on above, this last section addresses this underdeveloped issue and explores

whether the capital-form posits or not *an insurmountable limit* to the embedment of dialectics into education.

By looking closely at some of the literature about critical thinking and critical education produced by Marxist scholars working in the fields of Pedagogy and Education, it is possible to discern two approaches to the matter being dealt with here, namely, whether dialectics can be integrated into teaching/learning encounters, turning thereby education into a veritably critical education—education aimed at social emancipation.

For some, education does not emancipate humans from capitalism, but education itself must be emancipated from the yoke of capital (Azeri, 2020). Education is stamped with the ‘mark of the... mode of production of which it is both a constituent and a product’ (Azeri, 2020). Capitalism subsumes education to the imperatives of value-valorisation, turning it thereby into a site for the production of humans as labour-power (Azeri, 2020; Rikowski, 2007, 2022). Education is part of the social process of producing pliable and compliant workers that accept as a natural fact that, in order just to reproduce themselves, they must expend their own labouring activity according to *others’* desires and goals, under the rule of *capital’s representatives* (see Harvie, 2006; Hill & Maisuria, 2022). Only *after* the supersession of capitalism, once the satisfaction of human needs substitutes the imperatives of capital’s self-expansion as the chief purpose of education, there will be grounds for the cultivation of critical thinking, i.e., dialectical thinking.

The second perspective is more amenable to the idea that dialectical thinking can be taught in educational settings, whereby educators can raise themselves to the critical role that in both perspectives they are endorsed with in the process of social emancipation. In fact, it holds that a critical stance towards education can

even combine education for social emancipation and education earmarked to the production of a saleable workforce, provided that capitalist forms of education are circumvented, i.e., that ‘educational encounters do nothing that is instrumental for capital’ (Rikowski, 2022, 431; see also Clarke & Mearman, 2003).

For this latter conception, there are no insurmountable barriers for the embedment of dialectic thinking into teaching/learning activities after all, since it depends on the commitment of the educator towards social emancipation (Pavlidis, 2015). Should educators push forward with dialectics hardly enough, critical education can leverage on the full potentialities of dialectical thinking. Education can ultimately ‘liberate knowledge from capital’ if ‘infused with *the spirit* of communism’ (Rikowski, 2022, 432). Yet spirits or spectrums barely have content, so the task of critical education indeed consists of *imagining* what this spectrum should eventually turn out to be, what ‘non-capitalist education could be’ (Mathison & Ross, 2022, 134).

This is a perspective stamped with profoundly idealistic traits, the very same ones that Azeri (2020) aptly identifies in the case of Freire’s ‘emancipatory education’. The ‘critical’ dimension of critical education is determined in the last instance by the ‘*desire* and the *effort* [of the educator] to understand developments and processes within social reality... in view of changing it’ (Pavlidis, 2010; our emphasis). Dialectical thinking lacks any potentiality different from the abstractly free consciousness of the educator, so the capitalist form would not be an obstacle for embedding dialectics into teaching provided that educators are committed enough with social transformation. Still, despite all these claims, reality determines consciousness, and not the other way round. Furthermore, this view relapses into the traditional divide between subject and object of knowledge and, by the same token, into the divide between educator and student: the educator has become ‘emancipated’ by means of mastering the

tool (here, dialectical thought) and has to emancipate the student, who becomes a *passive* subject in both the process of knowledge acquisition and the emancipatory process that the former allegedly leads to.

Other attempts to set the grounds for a Marxian-informed approach to education replaces the self-determining will of the educator by the constitution of capitalist societies. Education produces labour-power, and labour-power turns out to be a ‘conscious commodity’ (Rikowski, 2007), i.e., a commodity that can become self-aware of its own determinate condition, its existence as a commodity. This circumstance makes labour-power the weakest link of capitalism—the only source of surplus value bears the potential capacity to realise that capitalism pivots around its exploitation. Raising the commodity labour-power to self-consciousness is the task of critical education—educators must dig into this ‘hole’ of the constitution of capitalist societies in order for the humanity to find a way out of capitalism (Rikowski, 2022, 417).

That is certainly a promising move in the right direction in analysing what conditions make possible and necessary the embedment of dialectics into educational activities—it links dialectics with the emergence of a revolutionary consciousness. However, the notion of labour-power as a ‘conscious commodity’ actually stops half-way in this attempt. Hungarian Marxist Geörg Lúkacs already attempted to work the revolutionary consciousness out of the notion of workers as ‘conscious commodities’ (Lúkacs, 1971). His conclusion was that the otherwise all-pervasive structure of reification brought about by the commodity-form cannot, for reasons that Lúkacs does not explain, deeply penetrate into workers’ soul. According to this, revolutionary consciousness is not premised on the class condition of workers, but on the rather abstract determination as *humans* (Starosta, 2003)—a condition that applies for both workers and capitalists.

Translated into education, the notion of labour-power as a ‘conscious commodity’ implies that humanity in the abstract is what turns classrooms into a site of a very determinate *social* praxis, namely, that of class struggle (Harvie, 2006, explicitly acknowledges this). Besides, since capital does not negate the human condition, but *actualises* it at this particular stage of development of the social forces of production (Starosta, 2016, 250), at the end of the day, this account does not acknowledge in the capital-form any insurmountable barrier to a veritably critical education, i.e., an approach to education based on the theoretical and methodological foundations of the Critique of Political Economy. In contradistinction to what contributions along these lines either subtly or overtly suggest, humanity is not the antithesis of capitalism and vice versa. There no exists a human condition separate or beyond the social relationship of production that constitutes it, as Marx already made explicit in his *Theses on Feuerbach* (Marx, 1976: 4). *Class condition*, not *human condition*, sets the grounds for the revolutionary consciousness to emerge. Assuming away class-determinations, as is common currency among both mainstream and ‘critical’ approaches to education (Hill & Maisuria, 2022), amounts to conceive of capitalism as a *non-antagonistic* form of social production—as if education was not stamped with the marks of the social mode of production of which it is both a result and a precondition and that, accordingly, was not fraught with the same antagonisms of the capitalist relationship of production (see Azeri, 2020).

As it stands, the argument made along these train of thought also suffers heavily from idealism. For this account, the supersession of capitalism ultimately boils down to people liberating from these ‘abstract social structures’, including the commodity-form, the capital-form, etcetera, that are constituted in and through human agency (Rikowski, 2007; on this, see also Bonefeld, 2014). Since these abstract entities are conceived of lacking any material grounds but human

consciousness,³ human emancipation depends on educators, who must intervene on, and transform, such forms of alienated consciousness. The task endorsed to critical pedagogy is then to come to understand all these abstractions that govern the capitalist world (Rikowski, 2007). Elsewhere, Rikowski even speaks of getting rid of the ‘psychology of capital’ (Rikowski, 2022, 430), i.e., of those abstractions that belong to the conceptuality of capital and that hold sway of social existence (Bonefeld, 2014). On this score, one should recall Marx’s own words stressing that, in the analysis and critique of capitalism economy he carried on in *Capital*, he did not proceed from ‘concepts’ or categories, but from ‘the *simplest social form* in which the product of labour presents itself in contemporary society’—the commodity (Marx, 1989, 544).

Summing up, while some authors consider that critical education becomes possible to the extent that the educator is truly committed to social transformation—being his/her praxis as a critical educator grounded on nothing else but this commitment, others contend that it is the human condition where one should look at in searching for the conditions of existence of that very commitment and, subsequently, on the feasibility of bringing dialectical forms of reasoning into education. Either case, dialectical thinking lacks any real determination—at the very least, its *class condition* becomes elusive. However, as it shall be seen just below, this obliteration of the class-mediated condition of dialectical thinking obfuscates any assessment of the limits that capitalism posits before critical education.

4.1. Critical education and class struggle

‘Material force must be overthrown by material force’, and ‘the weapon of criticism cannot replace criticism by weapons’ (Marx, 1975, 182). These well-known Marx’s statements are to the point in the discussion about the possibilities for critical approaches to education, those that take at their basis the

methodological foundations of the Critique of Political Economy, to thrive. If critical pedagogy is to play any role in the ‘movement of real life’ towards communism, the ‘weapon of criticism’ that it mobilises—the immanent critique of these ‘abstract social structures’ that are constitutive of capitalist reality; the ‘intellectual attack’ that digs out into the holes of capitalism (Rikowski, 2007, 2022)—is far from being enough. For critical pedagogy to be truly ‘critical’ and, accordingly, to fully leverage on the potentialities of dialectics as a method of reasoning, it must be situated within a broader *social practice* that points towards the supersession of capitalism (Hill & Maisuria, 2022, also raise this critical point). Otherwise, it falls to the ranks of ‘critical criticism’ and relapses into a contemplative stance to social reality into which dialectics fits poorly.

Since education is a moment of science, the same determinants that apply to the latter are equally valid for the former. Along these lines, Marxist revolutionary Paul Mattick commented that bourgeois reasoning was “‘objective science’: science proper’ (Mattick, 1936) at a time when the bourgeoisie was yet a progressive class and the working class ‘still had no *practice of its own*’. From then onwards, however, any further progressive social practice falls on the proletariat (Mattick, 1936). The *actualisation* of science, i.e., furthering the development of the ‘rational elements immanent in science’ and, by the same token, the development of labour productivity, is for Mattick something that cannot be done but through the course of the proletarian revolution (Mattick, 1936). There cannot be then any science outside *class struggle*. For Marxian dialectics is, according to Mattick, the intellectual expression of the practice of the proletarian revolution: ‘the theoretical science of the proletariat is either practice or is not science’ (Mattick, 1936).

The upshot of this is that neither ‘critical pedagogy’ lays outside class struggle, nor could dialectical thought unpacks all its potentialities out of the fights

waged by the proletariat for the supersession of the capitalist relationship of production. For education to be truly critical and, hence, revolutionary, it must become an inner moment of the practice of the *revolutionary* class struggle—«*capital-transcending class struggle*» as opposed to merely «*capital-reproducing class struggle*» (see, on this, Hill & Maisuria, 2022, 639).

Dialectical thinking, whether embedded into teaching/learning activities or otherwise, can find actualisation only when the working-class finds ‘a practice of its own’, i.e., when its practice expresses the movement of social life towards the overcoming of capitalism. Critical education and class struggle are reciprocally mediated, and they are so in a very determinate way: the revolutionary character of education finds its grounds on class struggle, and not the other way round. A revolutionary praxis within the classroom is not possible in the absence of revolutionary praxis *beyond* the classroom. Education can hardly take part into the production of the revolutionary consciousness if the working class is deprived of its own science, of his own practice—that, in turn, asserts itself only in class struggle.

But the argument can be pushed even forward. For it has been said that ‘critical education’ gets its *content* from class struggle. But what does it happen with its *form* when it partakes into the real movement towards communism that workers’ class struggle brings about?⁴ Hawel and Kalmring (2015) observe that Rosa Luxemburg emphatically stressed that ‘party educators’ should relinquish from their special role in order not to hinder class struggle and the development of class consciousness. This should not be read, as the authors do, that scientific knowledge has nothing to do with class consciousness. Rather the contrary, it means that education for social transformation cannot remain a separated sphere of social life alongside the revolutionary class struggle, when workers confront the need to ‘*teach themselves* according to the practical-theoretical demands of their own practice’ (Gorz, 1976, 58; emphasis in the original). As class struggle

demands self-instruction from the workers, education abandons its previous form and becomes *class struggle* simply as such. Revolutionary class struggle is the ‘radical critique of pedagogy’ (Azeri, 2020).

The above discussion already brings into relief that neither could education be emancipating, irrespective of how much desire or commitment with social transformation the educator puts on it, nor is it possible to turn the classroom into a site of class struggle. Dialectical thinking is revolutionary, and itself is an expression, a mode of existence, of the revolutionary struggle of the working class. Education is none of these two things, neither in its form nor, subsequently, in its content. There cannot be any such thing as ‘critical education’ within the confines of capitalism. And the movement of real life towards communism does not involve education, but self-instruction and self-acknowledgement of the practical necessities of class struggle—necessities that are *learned*, not *taught*. The conclusion is that education, however critical it might be, cannot leverage on the potentialities of dialectics as a superior form of human reasoning. Any attempt made concerning so will encounter sooner or later several limitations, that themselves are concrete instantiations of the *limited* and *limiting* character of the capitalist mode of production. The remaining of this section is devoted to set out a few important ones.

4.2. Concrete limitations for a Marxian-informed approach to teaching/learning activities

The class conditions of students stand as a first limitation for integrating dialectics into teaching. Classrooms are mixtures of different (dare we to say, antagonistic) social strata and classes. Producing labour-power is not the sole determination of the process of formal education.⁵ Education is a moment of the socialisation of almost all human beings irrespective of their class extraction. Be it a (future) worker or a (future) capitalist, every person should go through

education in order to become a fully functional societal being (Íñigo, 2020). That is to the effect that most students have never confronted, nor will they have to suffer, the material conditions of existence that the working class faces (Ollman, 1978). So, they will hardly be in need of ‘making use’ of the dialectical method of enquiry—their knowledge ‘about’ dialectics will not be actualised through their own social practice, whereby the effect on students of any Marxian-inspired teaching process would be minimal or, at the very least, will take years to bear political fruit (Ollman, 1978).

Still, even for students that either belong already to the working class or who might eventually fall in its ranks owing to the very workings of capital accumulation, the cultivation of dialectical thinking could result meaningless. After all, workers stand in an external relationship to their own skills, so their commitment to education—understood in the broadest sense of the term, as the internalisation and individually mediated actualisation of the riches of world-historical social knowledge—is limited from the onset (Pavlidis, 2012). Besides, capital does not even need workers that bear the capacity to appropriate all the riches of World-historical knowledge. In terms of capital’s own self-valorisation, that would be wasteful and expensive. Workers must be produced in a strictly ‘need-to-do’ basis, restricting their education to what is indispensable for them to ‘know-to-do’ according to their particular role within the social division of labour and the polarisation of the intelligence of production (see Braverman, 1998, 57). What workers must *not* learn is to exert control over the social content of their own labouring, collective activity, for it would imply the annihilation of capital at this very point (see Arboledas-Lérida, forthcoming). This second circumstance also impinges on Marxian-inspired educational activities, since dialectical thinking is premised on the inner relationship between the subject, the method, and the object of cognition (Azeri, 2020).

A third important hurdle, vividly highlighted by Ollman (1978), goes to the bourgeois ideology that most students bring with them into the classroom. That problem is particularly cumbersome for graduate ones, as these subjects have already passed through a relatively large process of socialisation and have been exposed to highly refined forms of bourgeois scientific thought. Whereas such a barrier might not be insurmountable, it would hardly be wrenched in the timespan that usually a course or a formally-organised learning activity takes—the course in SC commented on above spans just one semester.

Finally, there are social and institutional restraints in force as well, including the absolute priority given to ‘extrinsic’ goals in education (Clarke & Mearman, 2003); the split of knowledge production into academic departments, whereby students are predisposed to think of dialectics as a form of economics or philosophy (Ollman, 1978); or the thorny issue of exams and assessments, for it brings the occasion to consider any Marxian-inspired course, whatever its topic, as an ‘academic exercise’ (Ollman, 1978).

Conclusions

‘Critical thinking’ has gained momentum in debates about the present and the future of education. Recent assessments of teaching/learning activities aiming at fostering critical thinking have shown that the latter has fallen prey to the very same perils that it was expected to eradicate, like memorising and non-reflexive rote practice (Layanage, Walker & Shokouhi, 2021). Such a circumstance has brought the opportunity for Marxist scholars to advance the idea that Marxian-inspired approaches to education are superior to mainstream, bourgeois ones, and that dialectics should be integrated into syllabi and course programmes—if only for students to learn to think critically (Pavlidis, 2015; Rikowski, 2007; Ross & Gautreaux, 2018).

However, these calls have not been paired with systematic theoretical elaboration on the real potentialities and limitations that teaching/learning activities informed by dialectical enquiry might embody. This paper has addressed this gap by drawing on the experience gained in the design and implementation of a course in Science Communication for graduate students enrolled in the Bachelor's Degree in Journalism imparted at the University of Seville. The results yielded by this systematic-theoretical elaboration on the feasibility of bringing dialectics into teaching are somewhat ambivalent. This ambivalence, in turn, attests to the very antagonistic character taken on by social labour under the capitalist relationship of production.

As capitalism pushes forward the development of the productive forces of social production, self-reflexivity and self-awareness of one's own role within a broader context of interdependence and cooperation (Adler, 2007) is an asset for workers. And dialectical thinking is actually 'the most authentic form of the mind's critical activity' (Pavlidis, 2010), so it is the form of reasoning that allows students to truly penetrate into their own daily experience and to critically grasp their own social situatedness, the 'social content of their life activity' (Pavlidis, 2015; Bonefeld, 2014).

At the same time, the capital-form creates a barrier that it cannot transcend by itself, as it belongs to its innermost nature—every *apparent* supersession can only lead to the reproduction of that very contradiction at a higher level (Marx, 1986, 337). And such a limit is also felt at the level of critical approaches to education that take dialectics as their bases. This paper has identified and commented on some of the most important hurdles, including the very *social function* of education as the production of human beings determined *either* as capitalists or as workers, thereby reproducing the polarisation of the intelligence of production and the impossibility for workers to meaningfully engage with

scientific knowledge; the *class condition* of students, for just a minority of them will confront the material conditions in response to which dialectical thought becomes meaningfully actualised; the *estrangement* of workers from their own educational achievements, an expression in the realm of consciousness of the objective structure of reification that the commodity-form posits, shaping the whole social being (see Lúkacs, 1971); and the widespread *forms of bourgeois reasoning*, that cannot be outweighed just by discrete teaching/learning activities, however staunch the effort the educator puts on it might be.

The capitalist relationship of production fetters critical pedagogy and impedes the fully-fledged unleashing of the potentialities that dialectical thought embodies. Education for social emancipation does not, and cannot lie outside of the revolutionary class struggle, the progressive social praxis of the proletariat leading to the transcendence of capitalism (Mattick, 1936). But when class struggle posits education as one of its conditions of existence, the latter is stripped off its capitalist integument (its *form*) and it becomes *class struggle* simply as such, an exercise of workers' self-teaching according to the 'practical-theoretical needs of class struggle' (Gorz, 1976, 58).

This assessment of the potentialities and limitations of the embedment of dialectics into teaching/learning activities does not pretend to provide conclusive answers. Its purpose has been rather to spark debate on a dimension of critical pedagogy that has remained underdeveloped thus far, even among Marxist scholars and educators themselves. The author hopes that this contribution will help the community of critical educators to reflect more deeply on their own historical situatedness, thereby bringing about further elaboration on some of the key issues that has been raised here.

Notes

¹ Pavlidis (2015) lucidly observes that this notion of ‘autonomous thinking’, widely spread in mainstream literature on critical thinking, is highly misleading, for no person can think for another any more than the former can eat, drink or sleep for the latter. The concept ‘autonomous thinking’ does not describe a state of affairs different to what is common to all human beings, regardless of any historical or social conditions of existence. ‘Autonomous thinking’ is not a bulwark against biases or fetishism (Pavlidis, 2015).

² Distinction between ‘theory’ and ‘practice’ is retained here for the sake of clarity alone. But theory and practice should not be treated as pertaining to two separate and mutually irreducible domains of social existence, as though they were two self-sustaining entities. Such a conception would mean a relapse into the classic subject – object split that runs through the whole bourgeois worldview and that the materialist dialectics has already overcome. In the design and deployment of the course in SC, there is no such thing as a ‘practice’ isolated from ‘theory’ and vice versa. Rather the contrary, through ‘theoretical’ lectures, students are expected to raise to consciousness their own daily practice as science communicators, to penetrate into the determinants that shape their social existence as science communicators.

³ That all these ‘abstract social structures’ have an *objective existence* beyond human consciousness can be attested to by considering, as Chattopadhyay (2019, 52-53) does, that relative continuous overproduction is absolutely indispensable for the reproduction of *any* society. Yet the *necessity* for overproduction asserts itself in every class society as *surplus* labour (i.e., labour performed *beyond* the necessary for the reproduction of producers), as it is earmarked to the reproduction of the non-labourers. Under capitalism, ‘continuous relative overproduction’ expresses itself as surplus value. Capitalist crises are possible the most ostensible evidence that surplus value is much more than an ‘objective abstraction’.

⁴ Education as a form should be here understood as the split and subsequent estrangement between the process of knowing about reality from the process of actively transform it through self-activity, i.e., labour. In previous modes of production, as in the case of guilds that Marx comments on in *Capital* (Marx, 1996), the acquisition and refinement of skills requisite to become a master of a given craft was not detached from the labouring activity of the apprentice itself. That may help explain the emphasis that Marx put on the combination of industrial work, gymnastics and the attendance to lectures as the form of education in a communist society.

⁵ As soon as education is one-sidedly understood as the production of labour-power and other determinations become disregarded, its class condition fades away and humanistic claims as the ones commented above blossom. Education is not restricted to the production of a workforce with a given set of skills, for capital’s «positive personifications» (i.e. the capitalist class) need also to be educated and vested with competencies and abilities that will eventually allow them to exploit that labour-power as efficiently as possible (cfr. Braverman, 1998, 179-180).

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