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Toward a Political Economic Theory of Education: Use and Exchange Values of Enhanced Labor Power

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I explore theoretical conceptions of the use and exchange values of mathematics education within cultural-historical activity theory perspectives. The case of education in England is compared with that of health care (due to Engeström). Then I draw on Lave and McDermott's study of estranged learning from the early Marx, and from Marx's later analyses in *Capital*. They deduced the source of learners' alienation from learning in the enforced conditions of education, run by the educational establishment. However, I find their analogy limiting and hence erroneous. I turn to *Capital* to find the Marxian analysis of the "peculiar" commodity: Enhanced labor power. I conclude that the use-value of mathematics education derives from (a) learners' immediate consumption, and (b) their enhanced (mental) labor power. Although this explains the root, economic contradictions, cultural systems of exchange explain how these are symbolised in cultural forms of use and exchange value.

INTRODUCTION

In this article I aim to enhance understandings of the contradictions and alienation involved in learning and education in the English education system today. No doubt readers will find the case resonates with other advanced systems of institutionalised state controlled and audited systems in the West. I briefly describe the context and the empirical study that has motivated this concern shortly. For the moment, it suffices to say that in our fieldwork in colleges and universities the notion of the values of learning and knowledge as having "use" and "exchange" forms became compelling. The UK reform agenda under New Labor has built on and extended Thatcherite accountability systems in the public sector and led progressively to the invasion of all public service activity by the audit culture.

I then consider two theoretical approaches by leading sociocultural researchers working in the field of education and cultural-historical activity theory (CHAT), who draw specifically on exchange and use value in their analyses. Engeström and his coworkers refer to the contradiction between the use and exchange value as the prime source of contradiction within the object of activity in the state health care and other professions (see Engeström, 1996). Similarly, Lave and

McDermott (2002) draw on Marx (1844/1964, 1867/1976) via the analogy “Labor → Learning” to explain alienation of the learner via commodification of learning.

I critique these positions however, from a classical Marxian perspective, that is, that the use–exchange contradiction applies strictly only to commodities in a capitalist mode of production and cannot therefore be fully understood as a local contradiction within an Activity System or even within the field of education per se. Rather, cultural and symbolic exchanges between the economy and the educational field confer these forms on cultural and symbolic values. Thus, although I argue they are on the right track, I show that a complete political economic analysis of education must construe the use and exchange value of education and learning under capitalism as a property of enhanced labor power, a true commodity in the classical Marxian sense. I then illustrate how such a construal gives some insights into real contradictions in learning and education in England today.

The specific English context here is that of an audit culture gradually strengthened by the Blair–Brown government. This has ensured that every state-resourced school, college, and university is now managed and resourced according to a quasi market and targets expressed in terms of measures such as grades and credentials: Thus “accountability and efficiency” engages the educational system as a whole and everyone within it. I argue in this context teaching and learning become exchange-valued in the sense of cultural exchange and cultural capital, because although culturally, symbolically, and politically mediated, the educational field is at root dominated by the political and hence ultimately the economic field (Bourdieu & Passeron, 1977).

EMPIRICAL BACKGROUND

The theoretical work in this article has arisen from a quite definite programme of empirical work exploring participation in mathematics by learners in postcompulsory education in England (see the Acknowledgments section). Quite early on, the “currency” of mathematics (mathematics qualifications, grades, or credentials) arose as one of the key empirical themes when analysing learners’ and teachers’ discourses, both in the classroom interactions we observed and in interviews. It is a particularly powerful theme in students’ talk about the value of mathematics to their aspirations and in the teachers’ accounts of their pedagogy, and of the institutional culture in which they are performance managed in England nowadays (Williams et al., 2009a). To set against this we also looked for and found discourses of mathematics as being sometimes useful in various ways, for example, in science and engineering, either in these academic subjects’ practices per se or in anticipated future professional lives and careers. Indeed some students have said they find intrinsic pleasure from mathematics too.

In our students’ discourse in interviews, we found something akin to exchange value in this theme of currency of mathematics qualifications and grades, often said to be required, and hence in a way exchangeable—like a ticket—for entry to prestigious universities or courses, and symbolised in a strong CV, eventually worth real money from a well-paid job or a respectable career. Mathematics can be “worth the struggle” because it can offer exclusivity, due to being “hard,” and shows you are smart, and so competitive in the university and the job market. At the same time, the category or theme of “use” has proved prominent also, for instance, in our analyses of differences between an innovative “Use of Mathematics” and a traditional “Mathematics” programme. The innovative “Use of Mathematics” programme was designed to help students engage with and

understand their mathematics, and indeed we found that the Use of Mathematics students were aware of and spoke more of significant, real uses, whereas the traditional students rarely mentioned any uses beyond the use of mathematics in daily life such as shopping (this in the context of learning functions, graphs, and calculus in class). The discourse of mathematics being useful was especially salient for vocational engineering students who used mathematics in their engineering work and saw immediately a connection with their vocational activity: Indeed we found a blurring of the boundary between mathematics and engineering practices for these students.

Another example of the significance of the concept of value was found in the way the educational establishment (i.e., teachers and principals) conceives of the needs of students primarily as a need for grades and qualifications: The students were sometimes said to be embarked on an “educational career as a student” and their future defined by success on tests and examinations. Thus the establishment may say they have a “duty of care” to students to help them optimise their grades; this means they may be better to drop mathematics early on rather than invest in learning a subject which may provide little currency, or anyway less than that of another subject, for example, media or psychology.

This discourse may or may not be tempered by a relatively open access policy but the outcomes for the student in terms of grades are in the last resort ALWAYS preeminent in our projects’ data sets. At the same time, the institution may also have a duty to *itself* to require minimum grades for students to enter their courses, because too many students with low prior achievement may be expected to fail and the course may then be in danger of becoming uneconomic, or perceived to be of low status. The funding agency is said to stop funding courses where the rate of retention and pass rate falls too low, and the status of the college, its market position, and its funding depend on this. Thus access may be restricted, and certain “widening participation” initiatives frustrated or closed down.

What is more, we saw values crossing boundaries between classroom, institutional, and learners’ reflective talk. A highly paced, transmissionist classroom was associated with teacher and student talk of mathematics as currency (see Williams et al., 2009b). More competitive market-orientated institutions also seemed to provide a more exchange-orientated management culture, whereas open access colleges tended to require less highly paced teaching and sometimes less competitive practices.

There is also some important evidence of contradictions between these values in students’ and teachers’ talk. Students say they may persist in studying mathematics for its currency and for their CV even though they may dislike it, and say that they have no intention of studying it further. On the other hand for many students’ aspirations mathematics is claimed to be a vital necessity, but their grades may be insufficient to progress without retaking or going downmarket to study in a less prestigious university.

Similarly for teachers’ pedagogy: Some teachers tell of the conflict between wanting students to have time to “understand” the mathematics while making sure they “cover the syllabus” for the upcoming test. The conflict between performance on tests and depth of understanding is one that reaches out beyond the classroom, implicating policy, texts, tests, and assessments: The immediate needs of performance NOW conflicts with demands of use in the future. Mathematics seems to be particularly critical as a subject for highly valued courses and institutions, and also acts as a bar to progress in many technical subjects at a certain level: It seems then to pose the contradiction between “currency” and “usefulness” especially acutely. Thus, all told, the categories of use/utility and exchange/currency and their contradictions were pervasive in our empirical work.

The aim of this article then is to situate our understanding of the value of mathematics education and knowledge within a theoretical framework that will help provide insight into such contradictions. I first look to recent work in CHAT from Engeström (1991). I then look to Lave and McDermott (2002) for their understanding of alienated learning and critique their use of analogy with the early and later Marx. Thence to Marx's *Capital* for analysis of labor power as a special commodity within capitalism. Finally, I turn to Bourdieu to understand how the economy underpins cultural and symbolic forms, values and power relations in the educational field.

USE AND EXCHANGE VALUE WITHIN CHAT

A CHAT perspective views mathematical activity as social, and as collective, joint “object-oriented” activity. I argue that in this theory “values” must have a crucial role in shaping subjectivities, that is, the subject's projection of their (perceived, ideal) needs onto the object of activity (e.g., the real problem or task at hand). Because a collectivity of subjects is engaged in a joint activity, the collective object of activity is always at the nexus of the subjects' perceived ideal outcomes that drive their many actions. Thus, the object may be a mathematical task or problem, but the goal of one acting subject may be to “get the right answer,” whereas that of another might be to “understand the maths.” Yet a third might be motivated to “avoid anxiety” and might not be jointly engaged in the task at all—we cannot presume that a classroom is engaged in collective activity just because a collection of people sit together in one classroom with a teacher. The point here is that values are bound up in ideal outcomes and subjectively perceived needs, inevitably mediated by cultural norms.

Taking the CHAT viewpoint on what Yrjö Engeström calls third generation activity theory, R. Engeström (1996) pointed out the contradiction inherent in the object of activity in health centres, that is, between what they call the use and exchange value of medical practice. The object of activity is presumably the health of the patient (which as we see shortly does not technically have an exchange value in the economic sense at all). The patient and doctor then perceive that the doctor is there to “help, maybe cure the patient,” which is of use to them both, and socially useful as well in general. But in fact there is another perception of the object (perhaps that of the practice administrator, or manager—who might also be the doctor), which is to record it as a unit of activity for funding purposes (and hence real money) for the health clinic. It might be the case then that the administrator pressures the doctor to complete the examinations in an average of 10 minutes, say, whereas the health of a difficult patient might ideally require much longer. One hospital doctor in England told me that he has been given a budget of 20 minutes to manage a death, that is, deal with grieving relatives, phone the morgue, complete the paperwork, and so on: It seems the UK National Health Service has a sophisticated conception of labor time!

Thus, according to the Engeström perspective, contradictions between exchange and use value of health care provide the primary contradiction in the health care unit, explained by the commodified nature of the object of activity in their health care system. This is said to provide a material basis for a contradiction in values from the points of view of different agents and their subjectivities. They may even be said to be engaged in two different activities: The one is motivated to cure patients, whereas the other is paying the bills to keep the practice financially viable. Indeed these different agents' subjectivities reflect their engagement in yet other bounding activities, histories, and practices that predispose them to see the clinical practice in their own typically contradictory

ways. The practice manager and accountant may be held accountable to a financial committee and may be disposed due to management training to attend to budgets. The doctor is trained professionally to treat the patient as a client with certain health needs and is perhaps answerable to professional ethics committees. And so on.

A similar analysis for education seems viable. The educational institution may, as is in fact currently the case in England, likewise be resourced in relation to a quasi-market exchange value of its recorded, assessed, certified grades, qualifications, and credentials, that is, the administrative, institutionalised outcomes of the activity of learning and schooling. The teacher may be professionally required or disposed by training to try to generate understanding of their chosen subject: The true use of their labor of teaching. And so everything just said of the health system may also be true in education. In just the same way that health services suffer from contradictions between management and professional medical ethics, so we can similarly analyse breakdowns in educational practice. To take a case: A school advised a student to pursue statistics rather than advance their mathematics to a higher level—despite the objective needs of the student who wishes to become a scientist—because the unit of funding for statistics proved more valuable to the institution than a further qualification in mathematics (see Williams et al., 2009a).

Indeed, these contradictions might be explained across the whole public sector in England under New Public Management where systems of accountability have led to the introduction of balance sheets where costs are in hard cash, whereas performance outcomes are measured by proxies such as tests, patient waiting times, or crime clear-up rates. The contradiction between proxy measure and real objective outcome provides a source of endless conflict: Bizarre results can be seen in the recategorisation or nonrecording of certain difficult-to-eradicate crimes, the unnecessary deaths of patients who have to be processed within required time targets, and so on, across the UK target-driven public sector. (Please google: the Mid-Staffordshire Hospital Trust scandal.)

But the educational context may require a rather different analysis from that of health; the object of education seems to serve different and perhaps more disputed social and economic functions, and its value to the various agents involved is open to some debate. Thus the need for an institution for “another grade C, even if it is in media studies and not maths” may be justified as in the learner’s interest too, even though it may be argued that as a budding scientist they may have more use for mathematics than for media. It is hard to see an immediate parallel in health: When the public discover that a hospital kills its patients in order to reach targets that allow it to achieve a “good league table performance,” all hell breaks loose in “Mid Staffordshire” and even nationally. The health of the patient seems so obviously and indisputably to be in the interests of, and useful to, the patients themselves (though one can think of exceptions). Speaking analogically—with due care for the dangers—we “kill off” the patients in mathematics education when we tell them they are better off doing media studies, getting the grades being more use to them for getting a university place. Actually, our schools usually kill them off in the classroom before it comes to such a choice: The equivalent in health might be a 10-day waiting list for patients with flu. As such the contradiction between values in education is less obvious and more difficult to disentangle.

Consider a classroom in Manchester on a dull, wet Friday autumn afternoon: The 12-year-old children are routinely calculating prime numbers up to 100—they are cooperative in this school task, as it were for their teacher, for their curriculum, for school tests—maybe even international tests, “doing their sums for Britain.” After Y. Engeström (1991) I call this activity “schooling.”

Suddenly an argument breaks out over whether the number one counts as a prime number. The teacher says not. But why? There should be a reason: What are prime numbers about, and what are they for? I call this learning mathematics (at least it is a starting point). The contradictions inherent are painful for the teacher, who knows they must “get the right answer” for the test but also may think that learning without understanding is an insult to the learning of mathematics as an authentic practice. Such contradictions can similarly be painful for learners, who may learn to play what seem like meaningless tricks to get the grades they need to progress. Thus useful, meaningful mathematical learning can be destroyed by its currency.

We need to understand how learning, or perhaps better, schooling—as opposed to diagnosing and treating, say—can become alienated and alienating for the learners. I turn now to a critical appraisal of Lave and McDermott’s (2002) penetrating analysis of “estranged labour/strike/learning.” I appreciate their insights into alienation of learning while questioning their analogy, and follow their lead from early Marx (1844/1964) to *Capital*, and hence to “use value” and the “peculiar commodity” he called “labour power.”

ESTRANGED LABOR/STRIKE/LEARNING

Lave and McDermott’s (2002; hereafter L&M for brevity) consideration of alienated or estranged learning achieves three aims. The first two involve significant but different analyses of learning-in-schooling (a) by analogy as labor, and (b) as a means of social distribution. The third is methodological. They argue the merits of their close, analogical reading of great works, in this case the analogy: Estranged (or alienated) *labor* → estranged (or alienated) *learning*.

Their work of analogy is interesting: C. S. Peirce suggested that in contrast to induction and deduction, abduction is the only true means of creating new insights and knowledge. Abduction involves the carrying across via metaphor, model, or analogy from a source domain to a target domain. Further, Koestler’s (1964) many descriptions of the “Act of Creation” are suggestive of this in the flash of insight, provoked by an analogy, a model, a vision, or a dream. The work of induction and deduction may then be important in working out the details of the new insight, ensuring logic and validity of the new conceptions or theory in the target domain. Working with L&M’s inspired analogy then, I seek to test its validity by deductive and to a degree by inductive means. Deductively, I work from Marx’s wider theory of political economy itself, and specifically what came later in *Capital* (Marx, 1867/1976).

The main body of L&M’s argument uses Marx’s early essay “Estranged Labour” (Marx, 1844/1964) to formulate a strictly analogical account of “estranged learning,” in which the exchange value of knowledge (viewed as a commodity) is seen as the means by which the products of learning (credentials, etc.) are forcibly appropriated and hence alienated from the learner. This primitive alienation of the learner’s product thereby leads the learner to become alienated not only from this standardised, tested, approved knowledge, but from learning itself, and so from other learners, from educators at large, and so also, perhaps, from their own essential selves as social human beings.

L&M emphasise that by learning they mean institutionalised, school learning, quintessentially conceived of as learning prepackaged, standardised curricula, assessed in tests, exchanged for grades, awards, and accreditation (what they refer to as the surplus value of school learning). They thereby implicitly allow that the many sites for informal learning outside institutions may remain unpolluted, as it were, by the expropriation of the educational establishment.

TABLE 1
The Analogy Mapping “Labor” onto “Learning”

<i>Marx (1844)</i>	<i>Lave & McDermott (2002)</i>
Labor produces commodities	Learning produces commodities
Labor produces labor	Learning produces learning
Labor produces labor as a commodity	Learning produces the learner as a commodity
So the laborer “feels at home when he is not working, and when he is working he does not feel at home.” (Marx, 1844/1964, para. 20).	So the learner “feels interested when he is not learning in school, and when he is learning in school he is not interested” (L&M, 2002, p. 34)

Note. From “Estranged Learning,” by J. Lave and R. McDermott, 2002, *Outlines: Critical Social Studies*, 1, p. 34. Copyright © 2002 by Open Source Journal Outlines. Reprinted with permission.

The key conclusion from this analogy is that learning becomes alienated—just as labor—by the forced expropriation of the learning by the “establishment” from the learner in the form of credentials in exchange for grades—just as labor produces a surplus in the form of commodities in exchange for their wages. The resulting syllogism of alienation follows (see Table 1, taken from L&M, 2002).

In L&M’s first analysis, then, a somewhat a-historical, discourse analysis is conducted (though perhaps one of an unusual kind) in which the analogy is tested against what the authors can bring to the text from 20th-century educational discourse. L&M work closely—line by line to begin with, then paragraph by paragraph—from Marx’s 1844 text. They begin with the substitution of the term “learning” for “labour.” They then follow the consequences and interpret the analogues for “capital” (academic success/attainment at the expense of others and in competition with them), “wages” (grades), “private property” (curriculum, texts, standardised knowledge), “profit of capital” (credentials appropriated from others), “political economy/economic theory” (educational theory), and so on. This is a pure metaphoric analysis with the economy as the source, and education as the target domain and throws up interesting resonances and dissonances between Marx’s critique of political-economy and their own, analogical, critique of educational and learning theory and the “educational establishment.” L&M call it a genre of translation, but generative metaphor is also close. Generative metaphor generally benefits from a dialectic between source and target domains and is by no means a one-way transfer of meaning.

As with any analogy it only seems to go so far, but let us appreciate how far it gets us. The alienation of schooling may come from “unfree” learning, controlled by the educational establishment, which sets the rules, the curriculum, the tests, and thereby robs the learners of agency, of learning for their own needs. When learners work for the test, curriculum, and grades, rather than for their own need, then the product of their learning is alienated from them: The production of “grades” turns the learner into a commodity, actually a “grade-producer,” in competition with other school-learners, because a higher grade only means higher in relation to others, in the educational competition.

Credentials—the surplus products of learning—are then expropriated by the educational establishment (the school/institution/ministry of education) as surplus value that valorises the educational establishment itself, which is indeed surplus to the learners' true needs. In many places it may even then be used to justify institutional resourcing, and we may even add, teachers' and head teachers' salaries in current UK conditions. As such they enter the real political economy in society, as their products are exchanged with the State for hard cash.

Inductively, our project's empirical findings may not have any problem with data fit to L&M's model of alienation this far: We have seen students taught inappropriate things in inappropriate ways in order that they should produce a better grade profile for their institution in an apparently efficient way. We have seen learners and teachers become grade producers to the extent of learning and teaching incorrect or malfunctioning mathematics, of prioritising test preparation over understanding, and so on. More, the learner tends to identify themselves as successful grade producers, or not: They express themselves in the commodity form which Marx and L&M say alienates them from their essential, social, human essence.

In response to such criticism, many in the educational establishment would say that they teach what the students need to learn in order to get on, and progress with their educational career. Many well-trained students often say much the same: It is therefore sometimes better not to study mathematics if the grade is risky, better to distinguish oneself in the market by studying something else. A student "needs to be told" that they should drop maths early on in their course if their grade prospects are risky, and the establishment's "duty of care" to the student requires it. The students mostly reflect this strategic thinking: Better to modify one's career aspirations rather than pursue mathematics and risk a low grade or fail. The interests of the school-learner and the educational establishment are thereby discursively aligned in grade production by such common sense.

But we must question how far this analogy of labor → learning works theoretically, from a dialectical materialist point of view. In a sense learning, like labor is clearly "work": It requires effort over time and is motivated by the fulfilment of needs. The difference, according to Marx, between labor under capitalism and what we are here calling work is in the alienation of labor, due to its expropriation by capital, which by virtue of private ownership of the means of production, maintains its right to the product of the labor it purchases (i.e., by appropriating the end product—the commodities that contain surplus value created by labor power). I suggest that it is not clear that the work of learning is (a) labor, or (b) entirely expropriated from the learner.

My broad conception of work here includes labor, but also might include picking fruit from the garden, breathing air, maybe reading, and so on, including the fulfilment of needs, material or cultural, through *consumption*. It is not necessarily forced and does not necessarily involve alienation; it certainly includes work done as leisure in the laborer's free time. As such I suggest learning is in general an aspect of all work, which may or may not be alienated; in the form of school-learning taking place under "forced" and alienating conditions, it may become analogous to labor under capitalism, but in the form of fulfilment of real needs, it may be better thought of as part of consumption of use values, sometimes acquired by rights wrested from the system by struggle.

"Labour" as Marx (1867/1976) chooses to define it in *Capital* is done for someone else and is more or less obviously "forced": Under feudalism labor was taken by the lords/church from

the serfs who worked their land. Under modern capitalism, the employers typically take this labor power and make commodities that then embody a surplus value: The laborers “labor” is thereby commodified, and appropriated, that is, directly alienated from them in these products. Insofar as learning is appropriated from the learner by force, purely for “grade producing” for the establishment, it is alienated, and L&M’s conclusions seem unarguable, so

First, the problem of alienated learning, like alienated labor, is ubiquitous. Second, it is not enough to understand learning problems like other production problems as simply an absence of knowledge, but necessarily as a mystification, a false focus, a problem that hides more than it makes available to reform. And third, if “remedies” are devised, . . . such solutions are never enough and often, not even a little bit helpful. (L&M, 2002, p. 38)

And, finally, the “school” theory of learning: “starts from learning as the real soul of education; yet to learning it gives nothing, and to professional education everything. (L&M, 2002, p. 39).

But what if we consider “work” including “learning,” which might not be alienated? This is not the route L&M take in this article (as opposed to, say, Lave, 1996). Rather they argued purely by analogy, “what if we simply replace ‘labor’ by ‘learning’ in Marx’s account”? This analogical work is then done by mapping concepts from political economy onto conceptual images in a theory of learning: Capital becomes the private accumulation of credentials, the capitalist becomes the “scholar/scientist,” and so on; certain key concepts are held constant across the two domains (e.g., division of labor, commodity, exchange value). The validity of the analogy requires reasoning within the target domain in education and cannot simply be assumed. However, although some concepts seem to carry over quite well, such as exchange value, there are several concepts missing from the educational domain targeted.

Strikingly, there is almost no mention of use value in either *Estranged Labor* or in L&M (the latter mention it just once). Indeed, there is no concept of “capital” in the educational domain. Does education then here exist in a political-economic vacuum? Of course not. And at this point L&M switch perspective and argue that the alienation of learning and the education system should be seen as part of the wider political economy of distribution: Let us follow them there.

EDUCATION IN A SYSTEM OF DISTRIBUTION

The latter part of L&M’s article then switches perspective (as if in response to the aforementioned critique) and proceeds to view education as part of the consumption/distribution side of the capitalist system: The analogical method is now dropped for the time being. Briefly, from this perspective credentialism provides a means for reproduction of a hierarchy of distributed knowledge and consumption—and so the sorting of the population into classes. This similarly alienates learners, but notably alienates some more than others! This is a quite different argument: L&M now use political economic theory itself, rather than analogy, to explain alienation of learning. Schooling serves as a means of “alienated distribution,” reinforcing the established stocks of knowledge and so reinforcing the educational hierarchy and its justification in sorting out the classes. The function of education here is explicitly political and ideological rather than economic as such.

TABLE 2
Lave & McDermott's Analogical Translation of Marx

<i>Marx</i>	<i>Lave & McDermott: Here is Our Translation Into the Sphere of Alienated Learning and Distribution:</i>
<p>“Capitalist production is not merely the production of commodities, it is, by its very essence, the production of surplus-value. The worker produces not for himself, but for capital. It is no longer sufficient, therefore, for him simply to produce. He must produce surplus-value. The only worker who is productive is one who produces surplus value for the capitalist, or in other words contributes towards the self-valorization of capital. If we may take an example from outside the sphere of material production, a schoolmaster is a productive worker when, in addition to belaboring the heads of his pupils, he works himself into the ground to enrich the owner of the school. That the latter has laid out his capital in a teaching factory instead of a sausage factory, makes no difference to the relation. The concept of a productive worker therefore implies not merely a relation between the activity of work and its useful effect, between the worker and the product of his work, but also a specifically social relation of production, a relation with a historical origin which stamps the worker as capital”’s direct means of valorization. To be a productive worker is therefore not a piece of luck, but a misfortune.” (Marx, 1867, p. 644).</p>	<p>“Learning under capitalist production is not merely about the production of knowledge; it is, by its very essence, about the production and distribution of assessed knowledge. The learner produces not for himself, but for his or her place in the system. It is no longer sufficient, therefore, for him simply to learn. He must produce knowledge appropriate to his situation. The only learner who is productive is one who produces test scores for the school, or in other words contributes towards the self-valorization and redistribution of the educational hierarchy. If we may take an example from outside the sphere of material production, students and teachers are productive when, in addition to belaboring their own heads, they work themselves into the ground to enrich the owner of the school. That the latter has laid out his capital in a teaching factory instead of a sausage factory, makes no difference to the relation. The concept of a productive learner therefore implies not merely a relation between the activity of learning and its useful effect, between the learner and what is learned (and can be shown to have been learned), but also a specifically social relation of education, a relation with a historical origin which stamps the learner as the school’s direct means of valorization. To be a productive learner is therefore not a piece of luck, but a misfortune.” (L&M, 2002, p. 38)</p>

Strangely, however, they return to the same analogical work in their conclusion, though this time they draw from *Capital*. They quote Marx and then translate, suggesting what he might have said about education (see L&M, 2002 p. 38): see Table 2.

Here the source of alienation is reallocated to distribution under capitalism: The school becomes an educational factory for distributing learners, and the use value of knowledge appears significant for the first time, as a value that learning produces, but produces “not merely,” that is, it appears as an accidental by-product here. Additionally, the concept of labor power still does not emerge in this account.

My essential criticism of this “learning → labor” analogy is that learning isn’t truly, literally labor-in-capitalist-production, (as L&M implicitly reveal in this analysis of distribution). Its surplus products (credentials/qualifications) are not truly exchangeable commodities in the market place as such, because they have in themselves neither use-value, (i.e., no use-able, productive knowledge in themselves) nor even true exchange value: They cannot be exchanged in a circulation with others as they apply only to the bearer—they are symbolic. The market the State sets up wherein college corporations compete for State funds on the basis of producing credentials is a

quasi-market without authentic commodity production, except as we argue below, in that of labor power itself.

Thus the learner can't actually exchange or sell their grades in the market, or exchange them for those of others, and if they give them to someone else, that other person that has been given the credentials does not thereby acquire the knowledge the original learner acquired in the process. They would have no value to anyone else. The value of the grades/credentials/qualifications is symbolic: They signify a property of their owner that is not otherwise immediately visible. As such, the credential may be symbolically valuable to their "owner," as a validation of the true use value of the learning acquired by the learner. It is evidence of an enhancement of their labor power when they eventually come to sell their labor on the market to a future producer. As Bourdieu and Passeron (1977) said of the notion of symbolic capital, and this includes educational capital, these symbols may be exchanged for economic capital in practice (though in Bourdieu's theory this is not how their symbolic value is determined). However, the purchaser pays for a qualified, skilled, certified person's time (e.g., a dentist's period of consultation) usually because their professional skills truly exist and have real use—not because there is a certificate hanging on their surgery wall while they drill. Therefore, labor power, "this peculiar commodity, . . . must be examined more closely" (Marx, 1867/1976, p. 274). Labor power, as Marx has it in *Capital* (chap. 6, Vol. 1), is a commodity purchased by wages for the use of capital, whose purpose is extracting surplus value (i.e., the accumulation of more capital) in commodity production. NB the use of labor power is here only a use value to the capitalist, and this use implies the production of commodities that themselves have use: Commodities are in the end consumed in use.

As with any other commodity, the exchange value of this labor power is determined by the value required (i.e., strictly the labor time required; see p. 274) to reproduce that labor power. Classically this can be formulated on a day-by-day basis as the value of the consumer goods required for workers' subsistence, but Marx included in such costs the workers needs both material and cultural, normative for a particular historical period, and specifically includes education.

Note, the concept of labor power as a commodity does not enter L&M's analysis, nor is the contradiction between use and exchange value of learning allowed to develop as such. They rather confuse knowledge-enhanced labor power—a genuine economic commodity—with its cultural-semiotic symbolic representations in the form of scores, credits, grades, qualifications, and credentials. I argue that it is absolutely essential to distinguish these cultural forms as such.

However, the use value of the labor power to capital (i.e., its capacity to provide a surplus) is very much a function of the skill, effort, commitment, and education of the worker, as well as the quality of the system of production. Marx provides a very concrete analysis of the productive effectiveness of free compared to slave labor in the United States in this regard: Because the free workers had to sell their labor on the market, they provided a quality of work the slaves never offered, and this allowed the owners to invest in ever more productive means of production.

To labor this point, as the productive forces of capitalism grow greater, it demands ever greater rates of surplus value. At the extremes, the productivity associated with computer software and the so-called knowledge economy affords huge surpluses from relatively modest investment of labor time, as long as this labor is high in power (hence the destruction of the hand-clerking and administrative sectors, *inter alia*, by software). The continuing survival of this economy requires an ever more complex productive system constituted by a complex division of labor, and hence education.

As L&M note in their second analysis, the education enterprise sits within the distribution system, and so its economic function is to provide suitably differentiated labor power to the labor market. In one sense, the education system can be regarded as one of consumption, that is, it is part of the necessary work of “reproduction” of the workforce, along with food, clothes, housing, health, and so on. By consuming education, the collective of students reproduce themselves as the workforce (with its division of labor) for the next generation. The nearer the students get to the labor market, the clearer becomes their competitive, individual jockeying for distinctions that serves to attune the labor force with the contemporary division of labor in the system.

MARX'S ANALYSIS OF THE VALUE OF THE COMMODITY LABOR POWER AND ITS CONTRADICTIONS

Marx's analysis of the genesis of the commodity begins with the production of artifacts prior to commodity production and exploitation generally, that is, with an absence of value—except in the pure sense of the use of an object (called its use value). This use is realised in consumption, for example, of the food we eat, the water we drink, and the air we breathe (these may not even be commodified, as yet). When surpluses are produced, the producers start to offer these surpluses in exchange for goods they need: Hence the primitive markets from which commodities become defined. The goods then tended to be exchanged by the law of value, on average: That is, the exchange value of the product is proportional to the labor time necessary to produce it.

All commodities realise their use-value in their eventual consumption, after being produced and exchanged, sometimes several times before reaching the consumer. On the other hand Marx also stresses that production, consumption, distribution, and exchange are not separate, autonomous activities. Rather, production involves consumption (of the means of production, of labor time, of raw and other processed material commodities). Likewise the workers' consumption involves production and reproduction (of labor power). Clearly, also, the division of labor is implicated in a distribution of consumption, of reproduction, and hence the education system.

The experience of enjoying doing mathematics (as with music, theatre, sport, etc.) can be seen as a realisation of the intrinsic, use value of mathematics in cultural consumption. But additionally mathematics can be useful in the broad context of utility as a problem-solving tool (e.g., as an intellectual instrument or model for other activity). We should not overemphasise this dichotomy in the two uses, however, as beautiful and elegant mathematics has historically often become useful long after it was created (consider Boolean algebra). To some extent the concept of mathematics as a language tool is helpful here. After Vygotsky (1978) we note that the semi-otic “instrument” is initially encountered in external use but tends to become inwardly directed, typically in planning activity. Thus, a mathematical model is never quite simply a labor tool for doing other work but also tends to work reflexively inwards on the self, and so is consumed. It works on one's cognitive capacities through reflection, and so on one's identity, and satisfies the cultural need for consumption. I am suggesting then that a “good” consumer of mathematics is likely to make “good” user of mathematics, perhaps later and elsewhere.

At any rate, the latter instrumental aspect of the use value of mathematics to the user resides in their enhanced work power, that is in their enhanced capacities for work, understanding, and enjoyment, whether in production or consumption, and whether in their home or working life. But it also emerges as exchange value in their labor power, used by the employer who purchases

it with wages. This provides another contradiction—the use of mathematics to capital may also provide a use to the workers in their own time. The implication is that the use value of mathematics education need not be entirely expropriated and alienated.

Another difference between education and other forms of the workers' consumption (food/clothing/housing and health) is that the former (alongside parenting, etc.) takes place on a generational time scale. This is an important difference, as the generational time-lag makes feedback from the marketplace into the education system problematic. There is almost always therefore a perhaps essential and inevitable introduction of state planning. As Marx points out in *Capital*, the state generally has to defend the quality of labor power from the ravages of individual capitalists (whose private, competitive enterprises have little interest in protecting their laborers from overwork, etc.) and in general has a responsibility as a state representing its class interests per se to reproduce it for the next generation.

Obviously, it behoves the paying State to make the re-production of labor power as efficient as possible while planning to offer variegated labor with, at least collective, flexibility for laboring in the next generation. The trend toward resourcing educational institutes by the qualifications they bestow on their learners can be explained by this search for efficiency via audit: The UK government in particular, and increasingly the modern state in general, manages all its social enterprises through an audit culture of target-setting, modelling of costs against accountable outcomes as previously explained. Each educational institution then becomes an enterprise unit in competition with others, and hence the measured learning outcomes must be standardised. New conceptions of equity also encourage specification of and standardisation of the knowledges involved.

However, prespecification of what is to be learned is problematic. According to L&M, the problem is that this is alienating because of the surplus value of credentialism. But this analogy is flawed: In the real economy the conflation of credentials with surplus value (implying expropriation) makes no sense. It is the learners' work of learning for grades that is itself alienating, when the learning itself cannot be perceived as of use for a genuine need but literally signals only the future commodity of labor power. Unfortunately the analogy of commodity, use, and exchange value is not properly developed in L&M's analogy, as the analysis of commodity and labor power (subsequently in *Capital* Vol. 1, chaps. 1 and 12–14) was not undertaken in Marx's 1844 essay on estrangement.

In an analysis of distribution and exchange under capitalism, then, we have one obvious contradiction: The efficiency of the educational investment (in the education/credentials of the future workforce) is in contradiction to the development of a highly productive, useful future labor power. This is in part the contradiction between the state's costs now and the capitalist economy's needs in the future. Here is a contradiction at the core of the curriculum, and one sometimes hears this in the voices of industry when they comment on curriculum development: Do they want thinkers–problem-solvers–inventors, critical knowledge workers, or do they want “obedience, facts, and skills” befitting operators of relatively static means of production.

But the crux of the contradiction is in the commodification of labor power—the use value of labor to the capitalist is in its capacity to produce a surplus, its product must exceed its exchange value, that is, the value of its necessary cost of production as a commodity by schooling, parenting, and so on, else there can be no net capital accumulation. But the interest of the laborer is the exact opposite: The value of learning for them is in their own consumption, in their enhanced work in their own time, and in their future enhanced labor power and its increased exchange value. Hence the historic struggle to keep children in school and out of factories.

We note for the learner there is a contradiction between learning for their consumption, intrinsic to the learning itself, and its value for their eventual labor power when they present themselves as commodities to the market. The latter futures market is always made present in the educational system by symbols of learning, grades and the like. This contradiction lies within the object of learning and in fact within labor power as a commodity itself.

This future exchange value for the learner is presented symbolically via credentials and grades but may be ultimately realised in the learner's enhanced work power and labor power, or increasingly in their capacity to enhance their work power or labor power. A confusion, a mystery, arises because in the meantime the educational establishment produced the grades for the State and received their reward in funding, funding that they consumed—some time earlier and more immediately! As such the schooling economy (an artificial marketplace established by the State to provide labor power of the right stuff to the market) is fed by credentialism that masks the actual economy, in Bourdieu and Passeron's terms the symbolic violence is "misrecognised."

If we consider mathematical knowledge itself to be a commodity then, as previously argued, it is economically only realised as such in enhanced labor power (labor power enhanced by mathematical knowledge—owned by the laborer). The capitalist is the future potential purchaser and user of this maths-knowledge-enhanced labor power, that is, the commodity that is to be bought eventually by capital from the laborer. Thus, capital buys knowledge-usability, albeit perhaps perverted by the fact that this has to be usable in producing surpluses in the capitalist system. But school institutions produce knowledge-as-exchange value as efficiently as possible in terms of schooling-labor time (and so ultimately reducing its exchange value for the learner). Thus, we see the use-exchange contradiction and the sense in which knowledge-enhanced labor power can be considered a commodity.

The depth of understanding of the learner, in so far as it confers enhanced labor and work power on the eventual laborer, has use, but the effort to create understanding (labor time of teachers, etc.) confers exchange value on this labor power. The contradiction between the value of enhancing understanding and the cost of spending the time to produce this understanding is therefore a real—not just symbolic or analogical—political-economic contradiction in the production of knowledgeable-labor power.

To sum up, there is a primary contradiction between consumption (the learning work of the learner that requires satisfaction of cultural needs now, e.g., use, enjoyment, and understanding) and production of the mathematics as exchange value (by the teacher, and institution, that requires credits and grades, that may or may not accurately signify later usability in production) in the joint activity of school learning and teaching.

TOKENS OF DISTINCTION AND SYMBOLIC CAPITAL

Because L&M proffer credentials as the surplus product of learning in the "educational banking system," it is necessary to consider their role more closely within this framework. Though in a sense Bourdieu and Passeron (1977) got there first, L&M (2002) convince us that the hierarchical consumption of education and consequentially the distribution of labor power by the education system to the labor market takes place through alienation, via "failure" and "success," that is self-justifying; access to privilege is justified by success in a meritocratic system just as exclusion is justified by failure (which they see as another, inevitable, development of alienation of learning).

The tokens that represent successful school learning (from grades to degrees) may then serve to distinguish potentially successful knowledge workers and are mediated by a certain view of culture (by which I denote the knowledge that mediates labor power reproduction from generation to generation). Bourdieu (1979/1986) showed how this is structured in ways that stratify the classes: The accumulation of certain types of knowledge can then be viewed as a cultural capital, but with due care for the analogy. We have argued after Marx's *Capital* that culture forms labor power. But it also has power in relation to consumption, and Bourdieu leads us in that direction. The upper classes distinguish themselves first and foremost through displays of consumption, rather than the correlated distinctions in relation to the production process.

But as we have previously argued the use-value of knowledge resides not only in labor but also in all the work of the worker, that is, in their own lives as well, in consumption, in enjoyment of the fruits of knowledge themselves. The alienation of the school learner implicit in the conception of a grade-producer might then be avoided in learning whose objective is use in this recreational sense.

Acquiring the tokens of success that distinguish the school learner, however, requires the learner to delay gratification, to subject needs in the present to the accumulation of educational "capital" that has exchange value later, on the market, in one's career. I do not mean to suggest that this is always how matters seem to the individual learner in practice. In fact Bourdieu's notion of habitus and field is helpful here, in the context of education, and of the scientific field to which it relates (Bourdieu & Passeron, 1977). The eventual outcomes of education are in fact mediated symbolically by all the trappings of grades and credentials and qualifications through schooling, and these can be viewed as symbolic capital that provide for (at least displays of) power in the educational field. Yet these symbols are always rooted in the economy.

Bourdieu allows for the development of significant degrees of autonomy of fields such as education from capitalism: Here is a role for the educational establishment after all. But the autonomy of this establishment generally goes only so far, even in the most technical, mathematical and scientific fields. The temporal power is usually to be found in profane hands, and is subject to immediate state influence (if the educational establishment needs resource, then it must play the tune it is paid to play). The schooling system as such is particularly prone to state linkages and in many places has very little autonomy now: Even the minutiae of the "three part lesson" plan in English Primary schools is laid down in detail and monitored via regimes of inspection.

Yet the economic value of mathematics—we must not forget—is nothing without its final consumption, in its use. Use—albeit potential use, albeit delayed use—in consumption, whether by the consumption of the learner now, the worker-to-be or in labor consumed by capital.

CONCLUSION

This theoretical analysis of use and exchange value began with the empirical codes used in our projects' thematic analyses of learners' and teachers' discourses, and after CHAT, contradictions between use and exchange value explained tensions and conflicts in the education system, between aspirations of learners and teachers, communities and educational institutions. Further, the work of Lave and McDermott took us a long way in understanding the alienation of learning under forced conditions. First by analogy of schooling with production (and hence learning with labor) and then by situating education within the distribution system, they offer an explanation of alienated learning. The latter analysis also led us to *Capital* and the concept of labor power.

But finally, what has been added to CHAT and L&M's understanding of alienation? It is argued that the secret of alienation of learning is found in the analysis of labor power as a special commodity, owned by the worker, but sold to and used by capital to produce surplus value. Many contradictions arise between the use and exchange value of labor power and its conditions of production in the education system, which explains alienation of learning, inter alia. Additionally, however, we see learners' consumption in education in the form of interest, enjoyment and understanding: General forms of use. These uses are contradictory in that they are at various times both essential and inessential to effective mathematical performance, and that includes test performances. Producing truly useful mathematical labor power may require that learners experience the power of mathematics in consumption, that is, in its use value to them, typically in understandings while in education. This costs time, and money, of course, and so a panoply of contradictions are implied.

Looking back: L&M's study was based in Marx's 1844 essay, which describes alienation as the product of private property and the theft of labor by capital. However, in 1844 Marx's analysis had not yet developed the understanding of the use-exchange contradiction and how this leads to labor power as the producer of surplus value in generalised commodity production. Nor had Marx yet developed the analysis in *Capital* concerning the contradictory nature of capitalism in producing crises of overproduction and the power of capital to create the conditions of its own destruction. In 1844 then, Marx's conception was incomplete, as is that to be found in L&M's analogy.

In this article, by providing the commodity labor power as the source of alienated learning in the capitalist education system we situated the enterprise of education within the whole dialectic of generalised capitalist production, hence potentially allowing education to be analysed with all its many political-economic contradictions. We considered, for instance, how learning, even learning in capitalism, can have use value to the learner in consumption as well as to capital in production, while necessarily also conferring exchange value on the learner as labor power. Thus this alienation is itself contradictory, and schooling produces both use and exchange value as dialectical, unitary but opposite sides of the commodity it produces.

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