Towards a political economic theory of value in education

[Researcher X]

Abstract

In this paper I explore theoretical conceptions of 'use' and 'exchange' values of mathematics in education within a CHAT perspective. I draw on Lave & McDermott's study of 'estranged learning', and from Marx's Capital. From the former, one deduces the source of learners' alienation from learning in the exchange value of mathematics education. However, I turn to Marx's Capital to find the correct meaning of use-value, and conclude that the use-value of mathematics education derives from (i) its value to learners in consumption, and (ii) its value in enhancing (mental) labour power.

Introduction

Quite early on in this project, the 'exchange value' or 'currency' of mathematics (mathematics qualifications, grades, or credentials) arose as one of the key features that structures discourses of students' aspirations and experience, of learning and pedagogy, and of the institutional culture. To set against this we also looked for and found discourses of maths being 'useful'. The aim of this paper is to situate our understanding of 'use' and 'exchange' values of mathematics within a theoretical framework.

For example, in our analyses of the students' discourse in interviews: we found 'exchange value' in the form of discourses about 'mathematics qualifications/grades', said to be 'exchangeable' for UCAS points and entry to prestigious universities or courses, for one's cv, and eventually for money from a well-paid job. Mathematics can be 'worth a struggle' because it can be 'exclusive' (due to being 'hard') and shows you are smart against the competition in the university and the job market. At the same time, the category of 'use' has been prominent in our analyses of differences between 'Uses of Mathematics' and traditional 'mathematics' students' interviews and learning outcomes: we find that Use of mathematics students speak more of significant 'uses' whereas the traditional students tend to struggle to go beyond the 'use' of maths in daily life such as shopping. The discourse of mathematics being useful was especially salient in BTEC engineering students who truly 'used' mathematics in their engineering work and saw immediately a connection with their vocational activity.

Another example of the significance of the concept of value – one we may revisit occasionally in this paper, was found in the way the educational establishment (teachers and principals) conceives of the needs of students primarily as a need for grades/qualifications: the students are as it were embarked on an 'educational career as a student' and their future is mediated though success on these measures. Thus they may say they have a 'duty of care' to students to help them optimise their grades; if this means ensure they drop mathematics early on rather than invest in learning a subject which may provide little currency, or less than that of another subject (e.g. media/psychology etc.)

This discourse may be tempered by an open access policy (or not) but the outcomes for the student in terms of grades is in the last resort ALWAYS pre-eminent (in our data). At the same time, the College may also have a duty to *itself* to require minimum grades for students to enter their AS course, (and they may drop/discontinue a programme likewise) because too many students with low prior achievement may be expected to fail (or the course is in danger of becoming uneconomic). The funding agency (LSC) is said to stop funding courses where the rate of retention/pass falls too low, and the status of the College, its market position and its funding depend on it.

The purpose of this working paper then is to clarify the conceptions of 'use' and 'exchange' value in this 'economy' - specifically in relation to the 'activity' of mathematics learning, to mathematical knowledge and mathematical work/practice. The aim is to clarify and develop these (and perhaps other) analytical categories and so enhance theory and insights into our data and findings.

A reminder first though that our project's theoretical framework includes Cultural-historical Activity Theory (CHAT) as a means to analyse action/activity in classrooms and institutions and hence how these situate learners' and teachers' subjectivities (for more see Williams et al., project proposal; and Williams et al., IJER special issue). In summary and very briefly, CHAT provides a framework of concepts for understanding collective activity, systems, constellations of systems, and boundary objects that link systems (Leont'ev, 1978; Engestrom and Cole, 1997). It derives from Vygotskyan/Marxist materialist psychology and should by no means contradict a Marxist political-theory of value in education.

CHAT views classroom mathematical activity as social, as 'collective/joint object-oriented' activity (for an account, see Ryan and Williams, 2007). I argue that in this theory 'values' should have a crucial role in shaping subjectivities, i.e. the subject's projection of their (perceived, ideal) needs onto the 'object' of activity (the real task at hand). Because a collectivity of subjects is engaged in a joint activity, the 'object of activity' is always at the nexus of their many perceived 'ideal outcomes' that motivate the actions of all those involved. Thus, the object may be a mathematical task or problem, but the motive of one subject may be to 'get the right answer' while that of another might be to 'understand the maths' (a third might be motivated to 'avoid pain/anxiety', and might not be engaged in the task at all, so we cannot presume that a classroom activity has a 'joint' collective activity going on just because a collection of people are seat together). The point is that 'values' are bound up in 'ideal outcomes' in so far as these ideal outcomes are subjectively perceived needs, i.e. these needs are mediated by cultural norms and values.

Taking the CHAT viewpoint on what Yrjo Engestrom Y. (1987) calls third generation activity theory, Engestrom R. et al. (1996) have pointed out the contradiction inherent in the object of activity in health centres, between use and exchange value of medical practice. The object of activity as perceived by the patient is that the doctor is there to 'help/cure the patient', which is 'useful' to them. But in fact there is another perception of this object (perhaps the practice administrator, manager – who might also be the doctor) which is to record it as a unit of funding (hence exchange value) for the practice. Thus exchange and use value offer an analysis of the primary contradiction within the commodified 'object' of activity in their health care system,

and I would say this provides a material basis for a contradiction in 'values' from the point of view of different agents and subjectivities involved.

What we need is a similar analysis for education[1]. The educational institution is likewise resourced in relation to (the exchange values of) its recorded, assessed, certified, grades and credentials (administrative, institutionalised, outcomes of the activity of learning) – and so everything said of the health system seems also to be true in education. In just the same way that health services suffer from contradictions between management and medics and professional medical ethics, so we can similarly analyse breakdowns in educational practice. Thus, a school that advises a student to pursue statistics at GCSE I year 11 rather than shift their study from Intermediate GCSE to Higher, despite the needs of the student, may be behaving unethically because they envisage a reward for their league table of a statistics grade C despite its irrelevance to the student. This parallels the health service prioritising patients to meet waiting time targets over patients in need.

But our context requires a rather different analysis; the object of education seems to serve different social and economic functions to that of health, and its 'use' 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. As such the contradiction between 'use' and 'exchange' in education is less obvious and more difficult to disentangle.

My task then is to explore the concept of 'value'. I begin with a critical appraisal of Lave and McDermott's (2002) penetrating analysis of 'estranged labour/strike/learning', and question their analogy and in particular their use of the concept of commodity, and hence of use- and exchange-value in education. Then I revisit Marx's classic analysis of the commodity, the labour theory of value, alienation, labour power and surplus value, and ask what relevance for understanding 'knowledge: labour-power' as a commodity. Considering schooling institutions as state-organised sources of labour power and the generational enculturation of the division of labour and 'distribution' of producers, and of consumers and consumption leads finally to a discussion of certification of 'commodified' labour power represented as symbolic, educational capital.

Estranged learning

Lave & McDermott's (2002, hereafter L&M) consideration of 'alienated' or 'estranged' learning achieves three aims. The first two involve significant, but different analyses of 'learning' as a form of 'labour'. The third is methodological: they argue the merits of their 'close', analogical reading of (great) works, in this case the analogy: estranged (or alienated) *labour* = estranged (or alienated) *learning*.

[1] Engestrom and others have pointed the way to criticising alienation in education in work on 'expanding' the learning of learners to 'outside school' objects, essentially in an effort to escape the 'school' learning institution. Experience shows how hard this is to sustain, however, and especially in our context (post-compulsory, pre-university preparation).

This work of analogy is interesting: C.S. Peirce suggests that in contrast to induction and deduction, abduction is the only true means of creating 'new' insights /knowledge. Abduction involves the 'carrying across' of metaphor or analogy from a source domain to a target domain (Lakoff & Johnson, 1980; Lakoff, 1987; Lakof & Nunez, 2000). Koestler's many descriptions of the 'Act of creation', are suggestive of this 'flash of insight', provoked by an analogy, a model, a vision, or a dream (Koestler, 1964). The work of induction and deduction may then be important in 'working out' 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 will 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, 1976, orig. 1875). Inductive work will be anecdotal, but reference evidence to be found in other project outputs which are heavier with data.

The main body of L&M's argument uses Marx's essay 'Estranged labour' (Marx, 1844) 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 (grades etc) are forcibly appropriated and hence alienated from the learner. This 'primitive' alienation of the learners product thereby leads the learner to become alienated not only from knowledge, but from 'learning' itself, and so from other learners, and from educators at large (and also, one can say, from their own essential selves as human beings).

L&M emphasise that by 'learning' they mean institutionalised, school learning, quintessentially conceived of as learning 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. (Interestingly, but controversially, this might include apprenticeship, which was an inspiration for Lave's work on learning theory, see Lave, 1996; Lave & Wenger, 1991; Wenger, 1998. It seems odd, does it not, that the work of an apprentice in a sweatshop might become thereby less alienated than that of a school-learner?).

In this 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 bring to the text from 20th century educational theory/discourse. I find this a helpful and insightful analogy, but flawed, in the sense that the analogy leads to an incorrect view of the commodification of knowledge.

Then, perhaps in recognition of the limitations of their analogy – and I will argue that after all 'knowledge' is not 'actually' a commodity - they then re-conceive of the 'alienation' of 'surplus value' ('grades/credits/qualifications', including the whole accreditation system) in school learning as being part of the larger social system involving distribution of knowledge. In fact they now posit the education system as part of the system of distribution and the inter-generational production of a new division of labour and hierarchy of consumption within capitalism (after Willis, 1997, inter alia).

The crux of their conclusion then follows. They quote Marx and then 'translate', suggesting what he might have said about education:

Marx:	Lave & McDermott; Here is our translation into the sphere of alienated learning and distribution:
‘‘“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...” (1867: 644).	*“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, ibid, p-)

But this explanation of L&M’s thesis has been severely abbreviated- I will now work out this theoretical position in a little more detail and show where, for me, their limitations arise.

The labour-learning analogy

Lave and McDermott (L&M) work closely - line by line to begin with, then paragraph by paragraph – with Marx’s 1844 text: “Estranged labour”. They begin with the substitution of the term ‘learning’ for ‘labour’. They then follow the consequences, and interpret the analogues for ‘capital’, ‘use’, ‘exchange’ etc. This is a pure ‘discourse’ analysis of a analogical kind, with the economy as the ‘source’, and education as the ‘target’ domain (see Black, 1962; Lakoff & Johnson, etc.). This throws up interesting resonances and dissonances between Marx’s critique of political-economy and their own, analogical, critique of educational theory and the ‘educational establishment’. How does this work, and does it ‘really’ work?

In a sense ‘learning’, like ‘labour’ is clearly ‘work’: it requires effort over time, and is likewise motivated by the fulfilment of ‘needs’. The difference, according to Marx, between ‘labour’ and what we are here calling ‘work’ is in the alienation of ‘labour’, in the first instance 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 labour it purchases (that is the end product – commodities which contain surplus value created by labour-power).

My conception of work here includes labour, but also might include picking fruit from the garden, breathing air, maybe reading, etc: including the fulfilment of needs, material or cultural. It is not necessarily forced and does not necessarily involve alienation; it may even be work done as leisure in the labourer’s ‘free time’, and be conceived of as consumption. As such I suggest it is analogous to ‘learning’, which may or may not be alienated; in the form of school-learning taking place under ‘forced’ and alienating conditions, it may be analogous to ‘labour’, but in the form of fulfilment of real needs, it may be analogous to consumption.

‘Labour’ as Marx chooses to define it in *Capital* is always done for someone else and is more or less obviously ‘forced’: under feudalism labour was taken by the lords/church from the serfs who worked their land, etc. Under modern capitalism, the employers typically take this labour power and make commodities (that then embody a surplus value) with it: the labourers ‘labour’ is thereby commodified, and appropriated, i.e. directly alienated from them in their products.

I suggest that ‘work’ might include ‘learning’ which might not be alienated, but this is not the route L&M take: they argued purely by analogy, ‘what if we simply replace ‘labour’ by ‘learning’ in Marx’s account’? This analogical work is then done by mapping concepts from political economy onto their images in a theory of learning: capital becomes the private accumulation of credentials, the capitalist becomes the ‘scholar’ or ‘scientist’ etc. (see chart 1); certain key concepts are held constant across the two domains (e.g. division of labour, commodity.. see chart 2). The validity of the analogy requires reasoning within the new domain on the right-hand side of chart 1, and cannot simply be assumed: so their account takes up quite a few pages of argumentation and interpretative work.

Insert here chart I and II: from L&M (page 26)

Paragraph 1:	**Chart I:** Initial rewriting of Marx’s concepts of political economy into educational terms (variations from later paragraphs are listed in parentheses)	**Chart I:**
	political economy and its classical theory	=establishment and its theory (educational theory, learning theory)
	private property =	controlled and standardized knowledge (curriculum and tests)
	labor =	= learning

	capital =	= academic success (achievement), all at the expense of others
	land = capacities (access)	= capacities (access)
	wages =	= grades
	profit of capital =	= credentials, appropriated from others
	rent of land =	rent of land = assessed capacities
	capitalist =	capitalist = knowledge accumulator (scientists and scholars)
	land rentier =	land rentier = knowledge distributors (teachers and testers)

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Chart II:
Paragraph 1: Concepts applicable to both domains (variations from later paragraphs are listed in parentheses)

division of labor
competition (meritocracy, showing-off)
exchange value
production
commodity
monopoly (nobility, knowledge)

I have trouble with much of this mapping: as with any analogy it only seems to go so far. I accept that the alienation of (school-) 'learning' may come from 'unfree', controlled learning, controlled here by the 'educational establishment', which sets the rules, the curriculum, the tests etc. When learners work 'for' the test, curriculum, grades, rather than for their own personal 'use' or 'need', then the object of their learning may be alienated from them: the production of 'grades' turns the learner into

a ‘grade-producer’, in competition with other school-learners (because a higher grade only means ‘higher’ in relation to others, a norm).

Credentials - the products of learning - are then (at least in part) expropriated by the educational establishment (the school/institution/ministry of education) as ‘value’ (which is indeed surplus to the learners’ true ‘need’) and is used to justify institutional resourcing, (and we may even add, (head-) teachers’ salaries). As such they enter the real political economy in society- and we note there is no place for capital and the state on the right side of this analogy.

Inductively, however, I don’t think the project can have any problem with data fit to L&M’s model this far: we have seen students taught (even sometimes apparently useless) things in order that they should produce a better grade profile for their institution (hence surplus learning turned into some kind of value for the school/College), etc. And further, we have seen learners and teachers become grade-producers to the extent of teaching incorrect or mal-functioning mathematics. (Anecdote – a well-sold text book for GCSE taught students to identify an irrational number as one that produced a non-recurring decimal on their calculator!)

In response to such unethical practices, many in the educational ‘establishment’ would say that they teach what the students need to learn in order to ‘get on’, and progress; indeed the students 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. The interests of the school-learner and the educational establishment are thereby aligned in grade-production. What we need to explore here is the extent of this and how the ideology works. For instance, we are told that 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 reflect this strategic thinking too: better to modify one’s career aspirations rather than pursue mathematics and risk a low grade or fail.

Education as a system of distribution/division of labour/consumption

The latter part of L&M’s paper follows presumably from such a critique of their essentially analogical approach - a critic might have pointed to the ‘productivity’ of labour, and the ‘consumption’ aspect of learning. They then refer to the possibility of analysing education and learning from this ‘other’ side of the political economy under capitalism, viz the exchange or distribution side, and conclude that from this perspective credentials provide a means for reproduction of a hierarchy of distributed knowledge and consumption that similarly alienates learners. This is a quite different argument: it now seeks to use political economic theory itself, rather than analogy, to explain alienation of learning.

This is nearer the mark. The criticism of the ‘learning = labour’ analogy is that learning isn’t truly, literally ‘labour’, or if so then not of the most general kind. Its products (credentials/qualifications) are not truly exchangeable ‘commodities’, and they have in themselves no use-able knowledge. The learner can’t sell their grades in the market, or exchange them for those of others, and if they give them to someone else that ‘other’ person does not thereby acquire the knowledge the original learner

acquired in the process, and they would have no value to anyone else[2]. The value of the 'grades' is symbolic, and what it signifies is a property of its owner that is not otherwise immediately visible. As such, they may be valuable to their 'owner', as the true value of the learning acquired by the learner is an enhancement of their labour power when they eventually come to sell their labour on the market to a future producer. As Bourdieu and Passeron (1977) says of the notion of symbolic (and this includes educational capital) they may be exchanged for economic capital, (though in Bourdieu's theory this is not how they draw their symbolic value: more on this later).

Labour power, as Marx has it in *Capital*, is a commodity purchased by wages for the use of capital, whose purpose is extracting surplus value (i.e. the accumulation of more capital). The exchange value of this labour power is determined by the value required to reproduce that labour 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). Note – the concept of labour power does not enter L&Ms exegesis, nor does the use and exchange value of labour power as a commodity. They rather confuse the knowledge commodity with its representations-scores, credits, grades etc.

However, the 'use' value of the labour power (that is its capacity to provide a surplus) is very much a matter of the skill, effort, commitment, and education of the worker, as well as the quality of the system of production/activity. Marx cites an analysis of the productive effectiveness of 'free labour' compared to slave labour in the USA in this regard: because the 'free' workers had to sell their labour 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. The continuing enhancement of the technical quality of the means of production continues to call for better and more educated labour power.

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

As L&M note in their second analysis, the education enterprise sits within this 'distribution' system, and so its economic function is to provide (suitably differentiated) labour power to the labour market. In one sense they suggest the education system can be regarded as one of consumption: that is, it is part of the necessary work of 're-production' of the labour power of the work-force, along with food, clothes, housing, health etc…. By consuming education, the collective of students reproduce the workforce (and its division of labour) for the next generation. The nearer the students get to the labour market, the clearer becomes their

[2] Except, clearly, the grades may also have economic value to the school institution, and maybe the teachers, administrators, and principals if their own or the institutional resource is related to the records of such products.

competitive, individual jockeying for ‘distinctions’ that serves to attune the labour force with the present division of labour in the system.

The difference between education and food/clothing/housing (and health) is that the former (alongside parenting etc) takes place on a generational time scale, and this is an important difference, as the generational time-lag makes feedback from the market-place into the education system problematic. There is 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 labour power from the ravages of individual capitalists whose private, competitive enterprises have little interest in protecting their labourers from overwork etc., and in general as a class for the next generation.

Obviously, it behoves the state to make the re-production of labour power as ‘efficient’ as possible, while planning to offer variegated labourers with (at least collective) flexibility for labouring in the next generation. The trend towards resourcing educational institutes by the qualifications they bestow on their learners can be explained by this search for ‘efficiency’: this also encourages specification of and standardisation of the ‘knowledges’ involved. However, pre-specification 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: the notion that grades=wages (hence the learners means of subsistence) whereas credentials = surplus value (implying expropriation) makes no sense. It is the learners’ work of learning for grades that is itself alienating, when the grades cannot be perceived as of ‘use’. Unfortunately the analogy of commodity, use and exchange value is not properly developed in L&M’s analogy, as the analysis of commodity was not undertaken in Marx’s essay on estrangement.

In an analysis of distribution and exchange under capitalism, we have one obvious contradiction: that is that 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 labour power. This is in part the contradiction between the state’s costs now and the 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.

Notwithstanding the rhetoric regarding ‘creativity’ in the curriculum, the state’s choices of late have been to further marketise education so that educational institutions have become somewhat competitive factories that produce ‘knowledge’ for labour power, and the production process is to be made efficient by resourcing which is increasingly aimed to be proportional to indicators of educational ‘value’ produced. This value is realised in the end when the student presents their labour time to market, which is consumed by capital as ‘use’ in the production of commodities. This seems most apt at the upper end of the educational chain nearest to supplying industry’s current labour needs.

The crux of the contradiction is in this- the use-value of labour to the capitalist is in its capacity to produce a surplus, i.e. its product must exceed its exchange value (i.e.

roughly the value is its cost of production as a commodity) else there will be no capital accumulation. But the 'utility' of knowledge produced in schooling is always immediately/short-term mediated by its (the knowledge's) exchange value as represented symbolically in credentials/grades which require pre-specifying what is learnt and alienating the learner. This contradiction lies within the object of learning in institutionalised education for a capitalist society, and can itself only be overcome by the resolution of the contradiction between use and exchange value of knowledge in education, which Marx argued requires the end of capitalism (somewhat beyond the aims of our project then?)

In the last few paragraphs I have criticised L&M's argument but also taken it beyond their analysis in the spirit of what they began. Their own conclusion takes a different path – they finish with a methodological point about finding the resources to deconstruct ideology. But my task sticks with the concept of value, and follows the argument (and their own lead) to *Capital* rather than estranged labour. For L&M, the analogue of capital = academic success, and the capitalist = scientist-scholar. In a true political-economic analysis, *academic success* and *scientist/scholars* do not autonomously drive educational practice in general or 'school-learning' in particular. Rather they link to and have a function in the capitalist economy as producers of labour power, i.e. of a special commodity. This commodity deserves closer examination.

Marx's analysis of the value of the commodity: 'labour power'

Marx's analysis of the genesis of the commodity begins with the production of human objects prior to commodity production and exploitation generally, i.e. 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, e.g. of the food we eat, and the air we breathe, etc. (these may not even be commodified).

All commodities have a use-value, realised in their eventual consumption, after perhaps being produced and exchanged, sometimes several times, before reaching the consumer, e.g. tools for labour, subsistence for labour, etc.

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 labour-time). Likewise consumption involves production and reproduction (of labour power). Likewise the division of labour is implicated in a distribution of consumption/reproduction (and hence the education system).

The experience of enjoying doing mathematics (as music, theatre, sport, etc.) can be seen as a realisation of this intrinsic, 'use' quality of mathematics in cultural consumption. But we have (thus far in our project work) generally referred to mathematics as 'useful' in the broad context of 'utility', i.e. as a problem-solving, as an intellectual instrument or model for other activity. This distinction may be worth further consideration in our analyses: to some extent the concept of mathematics as language – tool is helpful here. After Vygotsky (1978) we might note that the semiotic 'instrument' begins in external (socialised) use becomes inwardly directed

(typically in planning activity). Thus, a mathematical model is never quite simply a labour-tool, but always works reflexively inwards on the self- on ones cognitive capacities through reflection, and so to identity – and to satisfaction of cultural needs for consumption. (Here I want to argue that the two aspects of 'use' are not opposite/dichotomous, or they shouldn't be.)

At any rate, the latter aspect the 'use' value of this mathematics to the 'user' is in their enhanced (mental) labour power: its value to them is in their enhanced capacities (for work, for production and consumption) whether in their home or working life (one of the contradictions again- the 'use' to capital is also a 'use' in the workers 'own' time). The implication is that the use value of mathematics need not be entirely expropriated.

Then how do symbols such as grades, credentials and qualifications fit in? As above, it is suggested that the exchange value of the knowledge to the learner is *represented* symbolically by its accreditation/grades/cv etc., what we have called in our empirical work 'exchange value of mathematics' (UCAS points, or some symbolic value that is thought to confer 'distinction' in entering a university and eventually a future career etc.) This exchange value for the learner is presented to the learner symbolically, but may be ultimately realised in 'use', in the learner's enhanced labour power, or increasingly in their capacity to enhance their labour power. Of course this value is not 'in' the certificate, the certificate is not money, or its ilk. It has generally to be recognised in the labour market, in practice in selection processes etc., as indicative of 'power' (potential labour) of the worker who has learnt something 'useful' that can be put at the employers disposal. The labour power it signifies is in the end truly 'consumed' not by the educational establishment, but by the capitalist.

A confusion, a kind of 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 market place established by the state to provide labour power of the right stuff to the market) is fed by credentialism and masks the actual economy that historically fed it.

According to Marx, the exchange value of a commodity is quantified as the amount of socially- necessary labour-time required to produce it (in this case the knowledge/capacity in the 'educated' or 'skilled' labourers labour power) … and educational institutions become producers of this value/power by THEIR teaching labour (as well as the effort/work of the students: I will not say the students' 'labour'– unless they are legally allowed to work so that educational activity is keeping them off the labour market).

If we consider 'mathematical knowledge' to be a 'commodity' then (as argued above) it is really the possessor of the enhanced labour power (enhanced, that is by mathematical knowledge), the future potential user of this, a maths-knowledge labour power, that is the commodity that is to be bought eventually by capital. Thus, capital buys 'knowledge-usability', while school institutions produce 'knowledge –exchange value' as efficiently as possible (ultimately reducing its exchange value for the learner). This is a source of the use-exchange contradiction and the sense in which knowledge-embedded-in-enhanced-labour-power can be considered a 'commodity'.

An aside, I think that ‘depth of understanding’ of the learner, in so far as it involves enhanced labour power on the eventual labourer, has ‘use’, but that effort to create understanding (labour time of teachers etc) confers ‘exchange value’ on the labour power. Enhancing understanding and spending the time to produce this understanding ARE therefore reflections of a real political-economic contradiction in the commodity of labour power.

Finally, there is a primary contradiction between consumption (the learning work of the learner that requires satisfaction of cultural needs now, e.g. ‘use/enjoyment/understanding’) and production of the maths exchange value (by the teacher/institution, that requires credits/grades, that may signify ‘later’ usability) in the joint activity of school learning and teaching. I have no reason to think the contradiction in the ‘production’ side is any more or less ‘basic’ than that in the consumption side of the economy.

Tokens of distinction and symbolic capital

L&M convince us that the hierarchical consumption of education and consequentially the distribution of labour power by the education system to the labour market takes place as much through ‘failure’ as ‘success’; access to privilege is conferred to some degree by success in a meritocratic system (which they see as another- perhaps inevitable – development of exclusion and alienation from learning).

The tokens that represent successful school learning (from grades to degrees etc) 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 labour power reproduction from generation to generation). Bourdieu (1984) shows how this is structured in ways that stratify the classes: the accumulation of certain types of ‘knowledge’ can be viewed as a cultural ‘capital’, but with care for the analogy. We have argued after Marx’s *Capital* that culture forms labour power. But is 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, preferring to hide the distinctions in relation to the production process.

But as we have argued above the use-value of knowledge resides not only in labour, but also in all the ‘work’ of the worker (i.e. in their own lives as well, i.e. in consumption, in enjoyment of the knowledge itself). 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 ones needs in the present for the accumulation of educational ‘capital’ that has exchange value later, on the market, in ones career.

I do not mean to suggest that this is how matters present themselves 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; Bourdieu, 2004). 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.

Bourdieu in fact allows for the development of significant degrees of autonomy of ‘fields’ 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 mathematical and scientific fields (Bourdieu, 2004). 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 called upon to play). The schooling system as such is particularly prone to state linkages and seems to have very little autonomy now.

Yet the value of mathematics – we cannot forget – is nothing but for its consumption, in its ‘use’. Use - albeit ‘potential’ use, albeit ‘delayed’ use, but use in consumption, whether by the consumption of the worker-to-be or in labour by capital.

Conclusion

This theoretical analysis of use and exchange value has taken us some way from the empirical ‘codes’ used in our analyses of learners and teachers’ discourses. The work of Lave & McDermott took us a long way in understanding how alienation of learning arises in the capitalist schooling system. First by analogy of schooling with production (and hence learning, and teaching with labour) and then by situating education within the distribution ‘side’ of the system, they offer an explanation of the product of learning as a commodity. But we found this product to be essentially a product of the labour of teaching rather than that of learning. For us the secret that is hidden from view is otherwise, in the production of labour power, for the next generation. Additionally, we see the learners consumption in education (perhaps as a somewhat subversive activity) – and suggest that one of the contradictions of capitalist consumption is that producing truly useful labour power requires that learners experience the power of mathematics in consumption, i.e. in its use.

References

Black, M. (1962). *Models and metaphors: studies in language and philosophy*. Cornell UP, Ithaka, NY.

Bourdieu, P. (2004). *Science of science and reflexivity*. Cambridge, UK: Polity.

Bourdieu, P. (1990). *The logic of practice*. Oxford: Polity Press.

Bourdieu, P. and Passeron, J-C. (1977). *Reproduction in education, society and culture*. London: Sage.

Engestrom, R. (1995), Voice as communicative action. *Mind, Culture and Activity, 2*(3), 192-214.

Engeström, Y. (1999). Activity theory and individual and social transformation. In Y. Engeström, R. Miettinen, & R.-L. Punamäki (Eds.), *Perspectives on activity theory* (pp.19-38). Cambridge: Cambridge University Press.

Engestrom, Y. (1987). *Learning by expanding: an activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.

Engestrom, Y. (2003), Conceptualizing transfer: From standard notions to developmental perspectives, In Tuomi-Gröhn, T. and Engeström, Y., (Eds.), *Between school and work: New perspectives on transfer and boundary-crossing* (pp. 19-38). Amsterdam/Oxford: Pergamon.

Engestrom, Y. and Cole, M. (1997), Situated cognition in search of an agenda, In Whitson, J.A. and Kirshner, D., (Eds.), *Situated cognition: social, semiotic, and psychological perspectives* (pp. 301-309). Hillsdale, NJ: Lawrence Erlbaum Associates.

Koestler, A. (1964). *The act of creation*. London: Hutchinson.

Lakoff, G.P. and Johnson, M. (1980). *Metaphors We Live By*. University of Chicago Press.

Lakoff, G.P. (1987). *Women, fire, and dangerous things: what categories reveal mind*. Chicago: University of Chicago Press.

Lakoff, G.P., and Johnson, M. (1999). *Philosophy in the flesh.* New York: Basic Books.

Lakoff, G.P. and Nunez, R.E. (2000). *Where Mathematics Comes From: How the Embodied Mind Brings Mathematics into Being*. Basic Books.

Lave, J. (1996) "Teaching, as learning in practice." *Mind, Culture, and Activity*, *3*(3), 149-164.

Lave, J. and R. McDermott (2002). Estranged learning. *OUTLINES: Critical Social Studies* 1 (2002), pp. 19–48.

Lave, J. and Wenger, E. (1991). *Situated Learning: legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

Leont'ev, A. N. (1978). *Activity, consciousness and personality* (Transl. M.J. Hall). Englewood Cliffs, NJ: Prentice Hall

Leont'ev, A.N.: 1981, Primaeval Collective Hunt. *Problems of the Development of Mind*. Progress Publishers, Moscow, pp. 210-213.

Marx, K. “Estranged labour” in Marx, Karl. 1844. (Ed D.J.Struik, 1964). The Economic and Philosophical Manuscripts of 1844. New York: International, 1964.

Marx, Karl. (1867). *Capital, volume I*. Harmondsworth, UK: Penguin, 1986.

Marx, K. and Engels, F. (Edited by C.J.Arthur, 1970). *The German Ideology, part 1*. London: Lawrence Wishart

Vygotsky, L. (1978). *Mind in Society: Development of Higher Psychological Processes*. Cambridge: Harvard University Press.

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge, UK: Cambridge University Press.

Williams, J.S., Davis, P., and Black, L., (2007), Sociocultural and Cultural-Historical Activity Theory Perspectives and Subjectivities and Learning in Schools and other Educational Contexts. *International Journal of Educational Research*, *46*(1-2), 1-108.

Williams, J., and Ryan, J (2007) *Children's mathematics 4-15: learning from errors and misconceptions* , Open University Press.

Willis, P. (1981, 1977). *Learning to labour: why working class kids get working class jobs*. Columbia: Columbia University Press.

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Appendix: some of the data from the preliminary analysis interpreted in paragraph 1 of this paper. (Here p25 refers to student interview number 25 etc).

Themes arising here were:

Maths qualifications/grades as a 'commodity' that can be exchanged for:

UCAS points (This EV all part of the 'grade game': e.g. passing psychology with a proper "A" better than maths with "AS" etc, e.g. P26, p64, p69, p74, p84, p91, p124 interestingly conflicted?..)

Money (P21)/well-paid job career (…p25, p53, p146)

Mathematics as 'exclusive' (because hard for many people: e.g. P20, 25) and so 'high status' value as an 'important' or high-rated subject (P25, p48) that is conferred on an individual who can acquire it, on their CV (P26, p74), etc.

The whole of P20 may be worth re-reading for this one, as it is expressed so clearly that this drives him, whereas he does not really see maths as enjoyable, fun etc.

Being 'good at maths' therefore equates to being a 'smart person' and indicator of other abilities, 'showing what I can do' and being a 'bit better' than competitors: (see P36, p68 , p74, p134..) though it may be that maths involves 'being logical' (p46..) that others may consider valuable (in part because of the 'use' of logic see p46 as an exceptional quote?)

Maths helps to get a 'good' uni place or job/career that they might want (p38, p53- quant surveyor, p57= accountant, p68=business uses , p73, p74, p136=nursing, p159=architecture, p73 = air traffic control .. p46 suggests specific career and hence implies some 'use'- an exception)

Indeed in some schools students report teachers as motivating them specifically for the EV (P26) though more quotes refer to parents (e.g. P29) than other sources of info re EV.

There are a couple of interesting anomalous cases that may be worth reading closely: Stephen and Michael (who speak of intrinsic – challenge/logical thinking/liking…as well as 'exchange' values) and Lee2.