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EXPANDING YOUNG PEOPLE'S CAPACITY TO LEARN

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EXPANDING YOUNG PEOPLE'S CAPACITY TO LEARN

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ABSTRACT: *Though it is being widely argued that expanding young people's capacity to learn is a viable and desirable goal of education, it it not always clear what this means, how it is to be achieved, and how the effectiveness of interventions is to be assessed. It is argued that the capacity to learn should be interpreted as a portmanteau term that comprises a varied set of positive learning dispositions. These are illustrated, and the idea of 'expansion' is glossed in terms of broadening, strengthening and deepening these dispositions.*

Keywords: learning to learn, learning capacity, disposition

1. Introduction[1]

The test of successful education is not the amount of knowledge that pupils take away from school, but their appetite to know and their *capacity to learn.* (Sir Richard Livingstone, 1941)

All skills will become obsolete except one, the skill of being able to make the right response to situations that are outside the scope of what you were taught in school. We need to produce people who *know how to act when they are faced with situations for which they were not specifically prepared.* (Seymour Papert, 1998)

One of the core functions of 21st century education is *learning to learn in preparation for a lifetime of change.* (David Miliband, 2003)

Pedagogy should at its best be about what teachers do that not only helps students to learn but actively strengthens their *capacity to learn.* (David Hargreaves, *Learning for Life*, 2004)

Effective teaching … should aim to help individuals and groups to develop the *intellectual, personal and social resources that will enable them to … flourish … in a diverse and changing world.* (*ESRC TLRP Evidence-informed principles for teaching and learning: No 1*, March 2006)[2]

As these quotations show, the idea that 'expanding the capacity to learn' might be a goal of education has been around for some time. Being an effective learner, these authors have argued, is not just a means – enabling students to learn more knowledge more efficiently – but a valuable end for education in its own right. In the last few years, this idea has gathered momentum. A variety of labels and approaches have been developed: learning skills, learning to learn, developing positive learning dispositions, and so on. But the core aspiration is this: that being an effective, powerful real-life learner is a useful thing to be; and that twenty-first century education should be aiming to help young people develop this generic capacity to learn.

Compared to the rhetoric and the good intentions, however, practical progress has so far been disappointing. There is barely a school or a Local Authority in the UK whose Mission Statement does not now include a nod in the direction of preparing their students for (to use Miliband's phrase) 'a lifetime of change' or 'becoming successful learners'. But on the ground, it has proved very hard to prevent these fine words slipping back into a concern with improving test performance. Hints and tips on how to organise, retain and retrieve information, or on discovering one's most effective 'learning style', have been co-opted by traditional educational goals, beliefs and practices, and thus diminished in their potential to expand the capacity to learn beyond the school gates. Being a 'successful learner' often turns out to mean nothing more interesting than doing well in exams.

We might suggest several reasons for this backsliding. One could be that, until very recently, we have had no clear conceptual framework for talking about what the capacity to learn involves. Secondly, we have had no coherent approach to pedagogy, or to school development, that is directly targeted at expanding the capacity to learn. And thirdly, we have had no reliable way of telling if this aim has been achieved. In the absence of all these, it is perhaps not surprising that the gravitational field of traditional educational concerns has proven so hard to escape.

In this paper, I want to review what seem to me to be some of the most promising recent developments in these three areas. (I have addressed the question of how to 'track the development of learning dispositions' in an earlier paper of that title with Margaret Carr (Carr and Claxton, 2002), and so shall spend more time here on the first two questions.) I shall argue that we are beginning to be able to unpack the notion of 'learning capacity', and thus to understand in more detail what it is we are trying to expand. We are also, I argue,

beginning to go beyond the 'hints and tips' approach to discover what type of culture change, in both individual classrooms and schools as a whole, is necessary to genuinely expand learning capacity. The jumble of mind maps, brain gym, learning styles and multiple intelligences of a few years back was a start – but I shall argue that we are now on the track of an approach that is more infused into the fabric of a school, and more intellectually coherent and well-grounded.

2. CONSTITUENT CAPACITIES TO LEARN

What does the 'capacity to learn' consist of? How are we to describe what it takes to be an all-round 'powerful learner'? One place to start is simply to ask people in education what they think the qualities of the capable learner are. Over the last eight years I have given talks and workshops on this subject to upwards of 20,000 such people, from Key Stage 3 students to headteachers and national policy-makers, and this is a question I regularly ask them. There is a high degree of consensus in the kinds of attributes or 'dispositions' they suggest. Effective learners are thought to be capable of being:

- curious, adventurous and questioning
- resilient, determined and focused
- open-minded, flexible, imaginative and creative
- critical, skeptical and analytical
- both methodical and opportunistic
- reflective, thoughtful and self-evaluative
- keen to build on their products and performances
- collaborative but also independent.

Encouragingly, these informally derived lists overlap significantly with those of other researchers such as Costa and Kallick (2000), Perkins *et al.* (1993) and Ritchhart (2002).

While people's intuitions are not a bad place to start, research in the learning sciences suggests additions and modifications to these lists. Cognitive neuroscience, experimental psychology and sociocultural studies can all make a contribution. There is space here to give only a couple of illustrations. All three of these disciplines, for example, suggest there is good reason for including, as a constituent of 'powerful learning', a quality we might call 'openness to imitation', though it is not one that appears so frequently on practitioners' lists. Cognitive neuroscientists now believe that our brains have evolved to make us disposed to learn by imitation. So-called 'mirror neurons' in the cortex automatically prime us to mimic what we see others doing

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around us, and that disposition towards imitation is one of the main ways in which cultural habits of thinking and learning transmit themselves from generation to generation (Hurley & Chater, 2005; Tomasello, 1999). Just as children moderate their emotional responsiveness by watching how those around them react, so they pick up from others learning dispositions such as 'persisting in the face of difficulty', 'relishing a challenge', 'pausing to reflect' and 'honest self-appraisal' (or, of course, their reverse). As Vygotsky (1978) suggested, habits of mind are contagious. So we might surmise that the effective learner is (selectively) open to this contagion.

Likewise, the flurry of recent work in experimental psychology on the 'cognitive unconscious' makes it clear that tolerance for hazy or non-articulate ways of knowing is also essential to learning (Claxton, 1997). People who are more receptive to their own faint hunches and inklings are better problem-solvers, for example, than those who must have everything clear-cut. Learning rarely proceeds in neat logical steps. More often it weaves in and out of periods of confusion and ambiguity. And those who have no tolerance for uncertainty – who have been trained to think that confusion is a sign of stupidity, for instance – have therefore had their capacity to learn reduced (Rokeach, 1950). So, if we are interested in expanding learning capability, we can ask how such an acquired intolerance for confusion can be prevented from developing, or how it can be reversed. What kind of school ethos, for example, would inculcate the healthy belief that hesitant and unclear knowing is a vital aspect of intelligence?

As we try to bring ideas from both academic and practitioner perspectives together, it is important not to allow the apparent objectivity of the former to swamp the valid intuitions that are often inherent in the latter. For example, what constitutes 'learning', and what kinds of learning, in what situations, are judged to be 'a good thing', are cultural value judgements. Some communities, I have found, want to argue with some of the dispositions on the general list, and, in a multicultural school, such conversations are to be welcomed. For example, you will see that qualities like 'respect' and 'retentiveness' have not made it on to my list, though they are central to some cultural models of learning.

Nor should we make the mistake of assuming that the opposites of these qualities are *not* to be valued. At a slightly deeper level of sophistication, we would want to see 'dogged perseverance', say, as one end of a continuum that runs to 'judicious giving up' at the other end. An effective learner knows when it is smart to abandon a project and move on, just as much as when and how to persist. Not every difficult book repays the earnest effort to finish it – as I have

learned, far too late in my life. Or, to take another example, research shows that in creative work it is important to be able to slide between concentrated and diffused kinds of awareness, and between sociable and solitary thinking (Martindale, 1999). As we get deeper into the exploration of what the capacity to learn involves, so we rapidly have to start overlaying the terrain of my simple list with meta-level qualities like 'balance' and 'fluidity'. Powerful learning is as much a matter of 'where' and 'when' as it is of 'what' and 'how'.

3. Becoming more Disposed to Learn

The second question is: what does it *mean* to expand these component learning capacities? What exactly is it that is being 'expanded'? To answer this, we need to delve a little more into the distinction between *learning a skill* and *developing a disposition*. Put crudely, when you have learned a skill, you are able to do something you couldn't do before. But you may not spontaneously make use of that ability when it is relevant in the future, if you do not realise its relevance; or if you still need a degree of support or encouragement that is not then available. In common parlance, it is not much use being *able* if you are not also *ready* and *willing*. When it comes to thinking, for example, Perkins (1995) has shown that most of us do not think as well as we can. We are not disposed – that is, ready and willing – to make use of the ability we possess.

To become more disposed – to develop the disposition – involves two kinds of learning in addition to mastering the skill. First, one can broaden and refine the sense of when it is appropriate to use this particular ability (i.e. to become more ready). And secondly, people can strengthen their inclination to make use of the ability regardless of whether other people are encouraging or supporting them (i.e., to become more willing). So when we talk of dispositions, we are not talking about a new kind of psychological entity that needs to be distinguished from skills. Trying to decide whether 'resilience' is a skill or a disposition is a bothersome activity that is neither productive nor necessary. A disposition is merely an ability that you are actually disposed to make use of.

For example, consider the disposition to be 'questioning'. Asking questions is partly a matter of skill, for sure. One has to know how to formulate good questions, and how to tell a scientific question from a religious one. But 'being questioning' is also a matter of inclination, of self-confidence, of a sense of occasion, and of entitlement. It is not much use being *able* to ask good questions if in practice you are very easily deflected from doing so. Asking questions makes you

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vulnerable: it might be a stupid question, or one to which everyone else knows the answer. So the capacity to learn depends, in part, on being willing to run that risk, and to do so you need a sense of entitlement: the belief that you have a *right* to be curious, to ask questions, to discuss, to imagine how things could be different. Some students don't feel that they do have that right. Some schools encourage students to develop a feeling of being disenfranchised from the process of making and critiquing knowledge. Such schools are not in the business of expanding their students' capacity to learn (whatever they may say).

So expanding the capacity to learn means creating a climate in which that feeling of enfranchisement and entitlement is systematically broadened and strengthened – not weakened, undermined or simply ignored. In such a climate, students' questions are welcomed, discussed and refined, so the disposition to question becomes stronger – more and more robust; broader – more and more evident across different domains; and deeper – more and more flexible and sophisticated. If you used to only ask questions with a teacher you liked, or only in English, but now you ask questions with more teachers in more subjects – and also when you are watching the television or talking with friends – you have strengthened a learning disposition, and thus expanded your capacity to learn. If schools are serious about helping young people get ready for a learning life, they have to think not only about what the skills of learning are, but about how, deliberately and methodically, to help those skills become stronger, broader and deeper.

When people think only in terms of teaching 'thinking skills' or 'problem-solving competencies', and neglect the need to cultivate dispositions, they often find that any apparent gains disappointingly fail to last, spread or deepen. Explicit teaching of thinking skills is often well-received by students, not least because it offers some welcome relief from content-dominated lessons. But the bulk of the evidence shows that such gains fade over time, and they do not generalise to other situations and topics (e.g. Nickerson *et al.*, 1985). Even some of the most highly regarded 'teaching thinking' programmes have had mixed success. McGuinness's ESRC TLRP project on 'Activating Children's Thinking Skills' (McGuinness, 2006) showed only modest gains in thinking for high-ability children who had been exposed to her programme for three years. Lower-ability students showed no gains. Neither did bright students who had had less than three years' exposure. (The 'Cognitive Acceleration' in science and maths programmes devised by Philip Adey and Michael Shayer (Adey and Shayer, 1993, 1994; Shayer, 1999) have consistently

produced evidence of spontaneous transfer to other subjects, but again, only after the kind of extended interventions that might be expected to develop dispositions as well as skills.)[3]

To put it baldly: the idea that you can teach students a bit of calculus in a maths lesson, and then expect them automatically to make use of it in next week's physics, is psychologically naïve. And the idea that you can tick a list of boxes labelled 'Can work well with others' or 'Understands the consequences of her actions' is naïve in the extreme. The mind is not built like that. Relevance and robustness have to be learned. And it is therefore the job of education not to assume that such transfer will take place, but to do everything possible deliberately to help it to do so.

4. Teaching to Expand Learning Capacity: Creating Epistemic Cultures

All of this brings us to the question of teaching methods and school cultures. If stand-alone courses on 'Thinking Skills' and 'Tricks of the Trade' don't do it, how *can* schools expand the capacity to learn? Recently, attention has turned to the development of what are called 'infusion' or 'epistemic culture change' programmes (Claxton, 2002; Perkins, 1995). These approaches are exploring ways in which the school as a whole, and its classrooms in particular, can become settings in which the various constituent elements of learning capacity are acknowledged, discussed, understood and systematically strengthened. That is what I call 'epistemic cultures'. Their teachers' guiding question is: *What would it mean to organise your classroom and your pedagogy in such a way that every day, little by little, in the midst of the Literacy Hour, the Romans or an experiment on magnets, your students were learning to learn more robustly, more broadly, more skilfully and more flexibly?*

Not surprisingly, we don't yet have a complete answer to this question. But we have made considerable progress over the last ten years or so. Through the 250 or so action research projects I have overseen (see Cardiff Schools Service, 2004; Fisher, 2006), as well as through the work of others such as Chris Watkins and his group at the Institute of Education (e.g. Watkins, 2005), the PEEL group in Melbourne (Baird and Northfield, 1992), and the Harvard group which I have already mentioned, some pointers are emerging.

To summarise: it looks likely that an epistemic culture will need to attend to the following areas of its operation.

- The *language* will need to change, to support a shift of attention towards the process of learning, and the ways in which people's learning dispositions are growing and changing.

- *Activities* will need to be selected, designed and framed so that they deliberately focus on stretching each aspect of learning capacity, and ensure that this goal is not eclipsed by a more familiar focus on the acquisition of knowledge and the completion of tasks.
- This may be supported by what my group (Gornall *et al.*, 2005) has come to call '*split screen thinking*' on the teacher's part: maintaining a dual focus on the content of the lesson and the learning dispositions that are currently being expanded.
- One implication of this is that there will need to be a good representation of what David Perkins (1995) calls '*wild topics'* that genuinely engage and challenge students.
- We suspect that epistemic classrooms will make the intention to expand their learning capacity absolutely *transparent* to students.
- And more than that, students will be actively *involved* in thinking about how to make the epistemic culture even more effective.
- There will be continual *transfer thinking*, in which students will be encouraged to look for out-of-school applications and modifications of the learning dispositions they are discussing and developing in school.
- There will need to be a sense of *progression*, so that dispositions continue to get stronger, broader and richer.
- And we think that *modelling* of the learning dispositions will turn out to be an important ingredient in an epistemic culture.

Let me look at each of these in a little more detail.

Language

The epistemic classroom should be a place where talk about the process of learning, the nature of oneself as a learner, and one's improvements and intentions for oneself as a learner, is continual and natural. The focus of discussion is on the 'how' of learning, more than the 'what' or the 'how much'. The teacher challenges students to think and talk about their own learning process with questions such as:

- How did you do that?
- How else could you have done that?
- Who did that a different way?
- What was hard about doing that?
- What could you do when you are stuck on that?
- How could you help someone else do that?
- What would have made that easier for you?

- How could I have taught that better?
- How could you make that harder for yourself?

Plenary discussions, small group discussions and reflective writing in learning diaries can all help this kind of conversation to become second nature.

Some workers in this area such as Chris Watkins (2005) think that these kinds of generic prompts will be sufficient. They do not want to plant their own theories of learning in students' minds. My view is that, provided it is presented as a tool for discussion and development, it is useful to offer students a vocabulary, such as the learning dispositions we discussed in an earlier section, that illustrates the kinds of things that 'the capacity to learn' might comprise. Getting students talking and arguing about the concepts behind such words as 'intuition' or 'risk-taking', and coming up with their own preferred terms and definitions, serves, we have found, to deepen their understanding, interest and ownership.

One secondary school I am working with, Walthamstow Girls High School in north-east London, for example, introduces just one of the 'learning muscles' every fortnight and gets the whole of Year 7 thinking and talking about it in every lesson during that period. As the students move from maths to English, so they know that their teachers will be asking them to deepen their understanding of the target term. Students are continually encouraged to become critical and creative thinkers and collaborators in the construction of their own practical knowledge and lexicon for talking about the process of learning.

There are two language changes that have emerged as particularly important. If these are not made, there seems to be a strong linguistic undertow that keep dragging teachers back towards more familiar ways of thinking and working. The first is the word 'learning' itself. When people talk about 'improving students' learning', it is all too easy to slide back into treating this as another way of saying 'raising achievement', and if you allow that to happen, the focus on expanding learning *capacity* can easily be lost. So, though it feels cumbersome at first, we have found that the effort always to say 'learning capacity' or 'learning power', when that is what you mean, is well worthwhile.

There is a subtler trap with the word 'learning'. Teachers may think that 'helping to improve students' learning' means *supporting* their learning, rather than *expanding their learning capacity* – and they are not the same thing at all. Helping them learn better is not the same as helping them become better learners. Effective support can easily create dependency, unless the teacher is continually looking

for opportunities to dismantle the scaffolding, and build students' disposition to do their own supporting. And that intention always to look for a way to do less, to hand the control back to the students, may be unfamiliar, and easily overridden by teacherly habits that are older and stronger. Again, getting used to thinking and talking about 'expanding learning capacity', rather than just 'improving learning', can help to counteract these tendencies to backslide (see Claxton, 2006).

The second problematic group are words that draw teachers' attention to what is fixed about students' minds, rather than what is malleable – capable of expansion. Words like 'bright', 'able', 'average' or 'weak', if used without qualification, can lead teachers to assume that students' current performance – and particularly where they struggle – is symptomatic of some kind of structural limitation in their minds, rather than of the current state of their expandable learning capacity. And this can make them less perceptive – or committed – about opportunities and activities to stretch capacity, rather than adjust expectations to fit an apparently fixed capacity. Intelligence researchers such as Lauren Resnick (1999) now routinely define 'ability' merely as 'the sum total of one's habits of mind'. It is useful to have this definition in big letters in the school foyer and every classroom, to remind everyone that learning capacity is a matter of habits – and habits are things that can change. (I have explored ways of thinking about 'gifted and talented' students in terms of learning capacity, rather than 'ability', in Claxton, 2005)

Potentiating Activities

One of the things we have come to realise is that, in lessons, as in the gym, 'activity' is not the same as 'exercise'. Expanding learning capacity requires being stretched, and being willing 'to boldly go' where learning itself is difficult. Fun activities that engage students without stretching them are not, in these terms, worthwhile. So-called 'bright', 'able' or 'gifted' students who coast through school are wasting their time – just as an athlete would be if they set up a training session in which they never broke sweat or got out of breath.

To help clarify this, Margaret Carr and I (Claxton and Carr, 2004) distinguished four kinds of epistemic cultures or milieux.

- *Prohibitive* milieux make it difficult or dangerous to express a range of independent learning attitudes and behaviours. Many traditionally 'effective' classrooms are prohibitive environments for any but a very narrow set of learning dispositions.

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- *Affording* environments allow students to express learning behaviours, but do not make it particularly salient or attractive to do so. Merely making it possible for students to learn somewhat independently is not enough.
- *Inviting* environments make it attractive to be an effective, independent learner, but do not necessarily challenge or stretch students' capacity to learn. Happy, active children who do standard things easily, but avoid difficulty, are wasting their time.
- Only the fourth kind of epistemic culture, *potentiating* milieux, make the exercise of learning muscles both appealing and challenging. In a potentiating environment, there are plenty of hard, interesting things to do, and it is accepted as normal that everyone regularly gets confused, frustrated and stuck.

Split-screen Thinking

To help with creating potentiating milieux, many of the teachers with whom we have worked have come to use what they call 'split-screen thinking' in planning and conducting their lessons. This helps them make sure they do not forget to construct activities and environments that stretch some specific aspect of students' learning capacity. On one 'screen' inside their heads teachers are thinking about how to help students grasp the content. On the other, at the same time, they are thinking about how to help students develop their learning capacity.

For example, about a year ago I watched a Year 5 lesson in which the teacher, Julie Green, was simultaneously teaching both Magnets and Questioning. She had laid out a circus of experiments with magnets for the children to do. But in the preliminary plenary discussion, she explained that she wanted them to see what happened, and then think about the kinds of questions that a scientist would be prompted to ask by the observations that they had made. In the final plenary, they shared their questions, and Julie led them into a spirited discussion about what makes a good scientific question, and how scientists' questions might differ from – or relate to – the kinds of questions that a historian, or a film-maker might ask.

One lesson to take from this example is that split-screen teaching does not sacrifice the content. There is no need to do less 'science' in order to find a slot in the timetable to 'do thinking'. In the infusion approach, attention to the subject-matter and to the process of learning, are woven together as warp and weft. The desire to develop young people's power as learners, and their feel for the learning process, is not in principle at odds with the need for coverage.[4]

Wild Topics

The intention to expand students' learning capacity does not exclude content, but it does influence the kinds of topics that are selected. They have to be engaging enough for students to want to put in the effort to pursue them. There are suggestions from many sources (e.g. Hargreaves, 2004) that the following features of a project or activity increase the likelihood that students will want to take it seriously.

- Rich: there is much to be explored
- Challenging: the topic contains real difficulty
- Extended: there is time and opportunity to go into it in depth
- Relevant: the topic connects with students' own interests and concerns
- Responsibility: students have some genuine control over what, why, how and when they organise their learning
- Real: solving the problem or making progress genuinely matters to someone
- Unknown: the teacher does not already know the 'answer'
- Collaborative: most students enjoy the opportunity to work together with others on such tasks

It is not, of course, possible to transform a school into a matrix of wild topics overnight. But many schools have found they can free up time for such activities if they really want to, and a commitment to increasing this time, year by year, would help to show students that you mean business.

Transparency and Involvement

The goal of expanding students' learning capacity seems more likely to take root in a school culture if students understand what is going on, and are given some significant role in helping to design and bring about the desired culture change. In some of the early learning-to-learn programmes, ideas and strategies were delivered to students cut and dried, as if all the hard thinking had gone on elsewhere, and all they had to do was accept and implement the good advice. But we are only just beginning to understand what an optimal epistemic culture looks like, and it is both useful to a school, and more engaging for students, if they are involved in a knowledge-creating, and not just a knowledge-implementing, process. In getting interested in, and finding out about, their own learning, students will necessarily be involved in extending their own learning capacity.

In the last couple of years, I have been lucky enough to be involved in a number of student-led projects on expanding learning capacity. I have worked with teams of eight-year-olds who have been visiting

each others' schools to find out about 'How the school helps us to become better learners'. I have watched a group of 16 Year 9 students design and deliver a two-hour workshop for 400 Year 8s about How to Be a Better Learner. I have watched four 14-year-olds run a 90 minute INSET session on learning to learn for the entire staff of their school. I have listened to the 13 and 14-year-old members of Bristol youth band The Naturals explain to a Professor of Education, Martin Hughes, and a room full of academics, how they have developed their own collective learning process.[5] I have talked to the Head of a First School in Harrow who routinely invites three and four-year-olds to give her feedback about how she could be a better teacher (and thus to think about their own learning). And as a result of such experiences, I am now completely convinced that young people are very interested in the process of learning, knowledgeable about it, and keen to find out more – if they are given the opportunity and encouragement, and their voice is taken seriously.

Transfer Thinking

A second lesson to take from Julie Green's lesson on magnets relates to her immediate invitation to the children to take what they have been learning about questions into new contexts, so they will look for wider relevance. I think that it will become a routine part of an epistemic classroom that students are encouraged to be continually on the lookout for wider, real-life opportunities to use aspects of their expanding learning capacity. Teachers' regular questions, to prompt transfer thinking, might include:

- Where else could you use that?
- What else might that be good for?
- What learning muscles do you use in your football training that might be helpful here?
- Can you imagine yourself using that at home?
- How do you think John Terry/Jacqueline Wilson/Stephen Hawking might use that learning muscle?

Through such continual prompts, teachers aim not just to encourage transfer, but to build up students' meta-level disposition to look out for transfer opportunities for themselves.

Progression

Some of the pioneering approaches to the development of learning capacity had no sense of progression. You were told the Right Way

to do a Mind Map, just like you might have been told the Right Way to add fractions, and that was that. Not only was there no critical discussion – who says there is only one right way? – there was nothing to explore. But now we have realised that learning capacity can be expanded hugely over time, and that therefore we need some way of talking about progression. If Julie Green's ten-year-olds can begin to think productively about what makes a good scientific question, where can they go next? How can they strengthen, broaden and deepen that exploration even more? Unlike some of the earlier approaches, I think it will prove essential that 'expanding learning capacity' is seen as a gradual, long-term, cumulative process that infuses the life of a school; not as a bolt-on or a quick fix.

Ingenious teachers are only just beginning to develop some ideas about this sense of progression. But the ones I know are agreed on how to go about finding out more. Ask the students. Share the question with them. Get the Year 6s to think about what they could do to help the Year 5s – or the children in Reception – develop greater 'determination'. Get the Year 11s to think about where the development of 'imagination' might lead next – and what similarities and differences there might be in the uses of imagination by poets, designers, athletes and scientists. I would now be very surprised if they did not take such a question and run with it to very interesting effect.

Modelling

The last ingredient of an epistemic culture that I think is going to turn out to be essential takes us back to the idea of modelling learning. If the brain is born ready, willing and able to imitate, then an epistemic culture has to make as much use of learning by example as it can. And if Vygotsky is right, to put it crudely, that you pick up your mental habits from the people around you, then we want young people to be around adults, and other students, who are themselves paragons of learning, rather than of knowing. It becomes part of a teacher's professional role to be continually saying 'I don't know', 'Oops!', 'I didn't expect that to happen', 'Now I wonder why?' and so on. Their job is continually to ask themselves: 'How can I best model curiosity, or open-mindedness, or empathy for my students today?' Some teachers, those who have been socialised into the ridiculous idea that they have to be endlessly omniscient, can find the responsibility to appear fallible strange and hard to begin with. 'What if they lost respect for me?' they wonder. But they need not fear. We find that students like their teachers to be fallible and

inquisitive, and not Know-Alls. I asked one teacher who had been practising saying 'I don't know' to his students whether he found it risky. 'No,' he said, 'I find it a relief.' And many have agreed with him.

The teacher is not the only learning role model that students can benefit from. There are fictional, historical or media characters who embody the qualities of resilience, playfulness, hard reasoning, good practising or open-mindedness. They can be the subjects of stories, discussions and projects. What kinds of learners are Ron Weasley or Bilbo Baggins? Television programmes like *Strictly Come Dancing* show celebrities in one walk of life being conspicuous learners in a new area, that of ballroom dancing. In addition, students can be role models for each other, if they are encouraged to share their out-of-school experiences of difficult learning. And caretakers, lunchtime supervisors, secretaries and parents all have fascinating stories of their learning to tell that could inspire the students, and make the rocky learning journey behind an apparently effortless achievement more visible.

5. Does it Work?

But now I need to turn, very briefly, to the question of whether the infusion approach is effective. And if it is, what are the essential ingredients, and what are optional extras? These are not easy questions to answer, partly because the approach is so multifaceted, and partly because the development of learning capacity is not easy to measure. If I am right in thinking that we need to look at multi-faceted culture change, rather than single-variable, clearly circumscribed interventions, then an experiment is never going to be able to isolate cause and effect relationships. There are too many potential 'causes' being varied all at once. We may just have to live with the fact that, to get effective change, teachers need to modify their language, put up some different displays, encourage more student questioning, create more open-ended projects, master split-screen planning, encourage the use of reflective journals, model more uncertainty and rearrange the desks – as part of a single initiative.

And, as many teachers in our projects have attested, they may need to change the mix and the pace from class to class, 'Best practice' for expanding learning capacity is more likely to look like a cloud of possible small changes that precipitates differently in different contexts. At a conference in Bristol in April 2006 called *This Learning Life*, American academics David Perkins and Shirley Brice Heath agreed that educational innovation happens not by replicating good practice, but by 're-growing' it, under different

conditions (see note 5). All the headteachers we have worked with, for example, find they have to make their own idiosyncratic distinctions between what they can do tomorrow, what they can aim for in a year, and what will take two or three years' preparing the ground before it becomes practicable. People who still think that a single approved Best Practice can be distilled, bottled and sold will find the small print on the label now carries the warning: Beware – Contains Snake Oil.

In practice, there seems to be a gathering consensus that small-scale, practitioner-led action research projects often have more impact than more rigorously controlled studies. In recent articles, both James and Brown (2005), drawing on the TLRP results, and Hargreaves (2004), drawing on his work with the Lifelong Learning Foundation, have acknowledged that such small-r studies have as much validity as expensive big-R funded projects. Teachers are much more likely to change what they do if they see someone else doing it differently, or hear or read a short story about a small-scale intervention which they like the sound of. Our 250 or so action research reports, deriving from projects in Cardiff and Oxfordshire, have been very successful at inspiring other practitioners to make small experiments of their own (see Cardiff Schools Service, 2002; Fisher, 2006).

Nevertheless, some properly controlled evaluations of the infusion approach to expanding learning capacity are essential. But even the decision about what to record and measure is problematic. The TLRP project on Learning How To Learn could not find a satisfactory instrument, and had to fall back largely on measures of school achievement. The trouble with this is that many students who get good grades are hardly what one would call robust, broad, rich all-round learners. Carol Dweck, for example, has demonstrated a correlation between high achievement in mathematics and lack of resilience in so-called 'bright girls' (Dweck, 2000). It is also beyond question that many young people are highly effective and creative learners in some areas of their out-of-school lives, yet – for a host of reasons – do poorly on school-type tests.

Several self-report instruments have appeared recently that aim to track the development of learning capacity. Some like Bob Burden's Myself As a Learner (MALS) scale (Burden 1998), or ELLI, the Effective Lifelong Learning Inventory, pioneered by Patricia Broadfoot, Ruth Deakin-Crick and myself at the University of Bristol (Deakin-Crick *et al.*, 2004), have reasonably well established reliability, but doubts about their validity. MALS lacks an underpinning model of learning capacity, while ELLI is a rather lengthy instrument that may not sustain respondents' conscientious engagement throughout.

Most important of all would be to find evidence that epistemic school cultures create more powerful, confident learners out in the big wide world. Even better would be to show that, as young people become more confident and capable in the face of uncertainty, complexity and responsibility, they resort less to stress-reducing behaviours that are reckless or self-destructive. We do not have those data yet – but it would be worth a million pounds of ESRC money to see if such correlations might be there to be found.

6. Buy-in

Let me make one final point. I think we are going to need copywriters as well as researchers, if 'expanding the capacity to learn' is to become established as a new end for education. To become more powerful learners, young people have to be willing to be stretched and challenged. They have to sign up for some hard work, and understand why they should. If you want to get physically fitter, you have to be prepared to get sweaty and tired. And the exertion becomes tolerable – even pleasurable – because you know that it is getting you where you want to go. You have a narrative that gives value to the effort, and this story helps you get through the hard times, and put in the hours.

But where is the compelling story about the real-world value of education that can get young people to turn up and put in the graft? Surely they are not persuaded by the old story that says: 'If you study you will obtain good qualifications and you will get a good job and be happy'. They know, however we may fudge it, that the Qualifications Game is one that does not work without a good proportion of relative losers: around 45 per cent at the present time. And as they watch television shows like *The Apprentice,* in which the two confident, successful women finalists can barely muster five mediocre GCSEs between them, young people are not inspired to go back to their maths revision.

We need a new story, one which shows young people that the capacity to learn, dry as it sounds, is truly what they are going to need in order to thrive, and which inspires them to sign up for it. We have to explain to young people that school isn't really about the Tudors and the Periodic table. It is about becoming a brave and skilled explorer; a cunning detective; an imaginative creator; a tough competitor – in whatever field of life they want to work and play in. We have to talk to them seriously about what we are up to; what they can expect to gain; and what they will have to put in. We have to tell a story about the end of education that recruits their energy and commitment.

Kyle is a 14-year-old from one of our action research schools in Cardiff. This is his story about why he goes to school.

> Why do I come to school? To develop my learning power, of course! They give us interesting things to explore that get harder and harder. In finding out how to grapple with them, we develop the 'learning muscles' and learning stamina that will enable us to get better at whatever we want, for the rest of our lives. People like scientists and historians have figured out special-purpose way to learn: as we get older, we practice those, and think about how they might help us in everyday life. As powerful learners, we will be better able to learn new skills, solve new problems, have new ideas and make new friends. We know that learning itself is the one ability that will never go out of date – guaranteed – (unlike programming your i-Pod!). And no matter how so-called 'bright' you are, everyone can get better at learning. Even professors have learning difficulties! Oh, and by the way, as we become more powerful learners, so we naturally do better on examinations too! It's a no-brainer, really. (Kyle, 14, Cardiff)

Youngsters like Kyle know what they need. It is not knowledge so much as character; not certificates but courage and confidence to face whatever life throws at them. That, for many of them, is what they lack. That lack is what is reflected in their escapism and desperation. Trying to find a form of schooling that enables all young people to get better at learning – to come at life venturesome, imaginative and questioning – is the most important task that faces education. And trying to find a way of presenting and explaining this, so that youngsters see the point and are willing, in much greater numbers, to put in some effort and give it a go, is the most urgent bit of PR that our society requires.

7. Notes

[1] This paper is an edited version of an invited keynote address at the Annual Conference of the British Educational Research Association, September 6 2006, Warwick University.

[2] All emphases added.

[3] Adey and Shayer attribute their transfer success to 'enhancing the central processor of the mind' (Philip Adey, personal communication), but acknowledge that 'the dispositions argument has comparable credibility'.

[4] Contrary to the frequently expressed assumption of traditionalists like Chris Woodhead, (e.g. 2002).

[5] A 'learning conversation' at the international conference on *This Learning Life*, University of Bristol, April 2006. For a report of this conference, see http://www.bristol.ac.uk/education/thislearninglife.

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