

Expansive Education

Teaching Learners for the Real World

© Bill Lucas, Guy Claxton and Ellen Spencer

Chapter 4 Expansive Pedagogy – a new model

An expansion of our pedagogy is imperative to prepare learners for an uncertain world. While subject specific content knowledge and applications may be just as pertinent today as ever before, it is more important now than ever to instill in our learners the capacity to own and be in charge of their learning.

Dr. Nicole Tempel Assisi, Principal, Da Vinci Science and Design Schools

This challenge from expansive education pioneer, Nicole Tempel Assisi is the one we try to answer in this chapter. Exactly what is or might be different in terms of pedagogy if you are trying to teach expansively? How does your approach change if you are explicitly seeking to cultivate certain dispositions for life and learning? In what ways do methods need to change if your assumption is that intelligence is learnable and mindset really matters? How can teachers connect with the real world outside their classroom in a routine and sustainable way? And if teachers are explicitly seeking to be learners too, engaged on a lifelong journey of enquiry, how does this impact upon their pedagogical processes?

In short we want to get closer to understanding more about the choices teachers and educators take on a moment by moment, lesson-by-lesson, daily, weekly, termly, course-based and long-term strategic basis. In doing this we will specifically be drawing on research we have undertaken in the last five years¹, as well as on the thinking of many whom we have already cited in chapters 2 and 3.

Defining pedagogy

The term pedagogy is not much used in the UK these days, though there have been signs recently that it is coming back into favour. In Europe it is much more widely accepted. And in the USA and some other English-speaking countries the phrase ‘instructional design’ is often used as a close synonym for pedagogy, with ‘instruction’ carrying a broader meaning than the more didactic sense it has in the UK.

We start from a broad definition of pedagogy. Where once it meant little more than the way ‘instruction’ is undertaken in the classroom by the teacher, we see it having a much wider sense to include not just the implied didactic element but also the roles learners have in being active participants in the process.

So our working definition is:

Pedagogy is the science, art and craft of teaching and learning. It includes all of the decisions which are taken to create the broader learning culture in which teaching takes place, especially with regard to the purposes of education – the dispositions which are most valued, the beliefs about intelligence, the governing assumptions about where and how learning in school happens and the roles of teachers and learners in the process. Pedagogy is a set of decisions which

teachers and course designers take to orchestrate teaching and learning to achieve their desired outcomes.

The decisions which shape the culture of a school or a space like a classroom or workshop have started to happen before the ‘teacher’ even enters. They have been taken either consciously or non-consciously by those who lead the institution and will be influencing many things such as the way adults talk to students, what is displayed on the walls and, very importantly, which things get noticed and rewarded and which are not valued or actually discouraged. On this last score, decisions about the ways different kinds of assessment are used and talked about have a significant impact. So, too, pedagogy does not stop at the lesson’s end. Decisions about what if any home work is set and how it is used (or not), decisions about the degree to which families are or are not encouraged to be part of the learning process after the lesson has finished and the degree to which pupils’ outside lives are recognized, prepared for and consciously learned from – all of these and more affect pedagogy in practice.

Implied in our definition is an answer to the question from which any discussion about pedagogy must begin:

‘Pedagogy for what?’

As the sub-title of this book indicates – *Teaching learners for the real world* – we are clear about the outcomes we think we are seeking. We want students to emerge from the school system with the kinds of dispositions and mindsets which will enable them to thrive in an uncertain world.

This means that the outcomes of effective expansive learning need as a minimum to include:

1. Routine capability (the disposition and expertise to be ready, willing and able to use what has been learned, often non-consciously, for specific situations)
2. Non-routine capability (the resourcefulness to be able to stop and think and then use what has been learned before in situations which are novel or difficult or where there is a lack of support)
3. An ethic of excellence (self-belief, a determination to learn from others and pride in learning activities well done)
4. Wider dispositions for lifelong learning (a transferable set of learning tactics, heuristics and attitudes).

As we think about expansive pedagogy we will want to bear in mind these four desired outcomes.

These outcomes are important as a counterweight to much of the published theoretical understanding of pedagogy which has been drawn largely from the experience of teaching of academic subjects, not from an assumption that we are cultivating certain important habits of mind or capabilities. This literature can drag us down to take decisions which are more about instrumental

accountability than they are about expansive education. As a result there can be an over-emphasis on decontextualized recall and regurgitation rather than on deep understanding, application and new thinking.

Now that we are clearer about desirable outcomes we need to touch, briefly, on four more variables – learners, teachers, learning environments and teaching and learning methods.

Teachers, learners and expansive education

In expansive classrooms the relationship between teachers and learners is different from the one found in more traditional ones. Expansive learners do more and learn differently, and expansive teachers seem, on the surface, to be doing less and are certainly doing things differently.

But if this sounds like a charter for loosely structured progressive, student-centred education nothing could be further from the truth. While of course students' needs and their voices are centrally important, the focus in expansive education is on the desired outcomes of developing young people's capabilities so that, as they go through school they acquire certain dispositions for learning, and when they leave school they are equipped to thrive at home, at work and in the wider community settings in which they will be living.

Teachers will be constantly asking and trying to answer a number of key questions:

1. How can I ensure that all learners develop growth mindsets?
2. How can I make activities as authentic and engaging as possible and at the same time expand the horizons of learners?
3. How can I make enquiry and questioning a central feature of all that we do?
4. How can I ensure that I offer learners the best blend of theoretical explanation and practical experience?
5. How can I create opportunities for learners to go deeper, become immersed and strive for excellence?
6. How can I organize classes in ways which actively encourage students to see themselves as part of a community or studio, making best use of all available resources?
7. How can I develop patterns of collaborative learning so that learners are well equipped to learn, play and work together with others and in a variety of contexts?
8. How to I ensure that the processes of learning are explicit and that the language we use to describe them is well-understood by all?
9. How can I make best use of face to face time and harness the resources of the virtual world?
10. How can I best facilitate the development of all the learners in my class?

Each of these questions is complex and requires the best efforts of teachers, supported by deep understanding of the topics that each question explores. We have already touched on some of the science behind each of them.

John Hattie has very helpfully described the ways in which teacher mindset needs to change, what he calls 'desirable mind frames' if teachers are to have maximum impact on student learning. Here we paraphrase his thinking.

The teacher's main task is to notice the impact of their teaching on student's learning and achievement. Teachers need to think of themselves as change agents, changing students from where they are to what they can be. They are adaptive experts in learning able to coach and model different ways of learning, actively seeking feedback about their impact on students.

Teachers need to talk less and listen more. Their job is constantly to be challenging and stretching learners, making their learning intentions and success criteria as explicit as possible within climates which encourage them to share perceptions about their impact on students' learning. It's essential that teachers develop and share a common language of learning with students and parents alike.²

Hattie's description exactly applies to expansive teachers whose focus is on visibility of learning processes (the development of powerful learning dispositions) and maximizing student learning and achievement. His strongly-evidenced arguments do not explicitly seek to create the kinds of expansive outcomes we have been arguing for in this book. Nevertheless we think his eight challenges above are critically important ones. The first two matter most to us – the relentless emphasis on teachers becoming better noticers of their own impact and the reminder to us all that teachers are fundamentally about changing the status quo of their students current attainment and expectations. The emphasis on change agency also makes us reflect on the observations of the pioneers whom we spoke to who stress that the kind of habit change which has teachers making considerable changes to the way they operate takes time, planning and belief founded on best evidence.

In classrooms organised along these lines, the role of the learner inevitably changes dramatically. Two metaphors help to illustrate the essence of this shift. If schools were ships, learners would be on the bridge helping to plot a course rather than being either passengers sitting back and enjoying the trip or in the engine room waiting for the captain's command. If they were theatres they'd be modern studio versions of the kind where there are no curtains, the audience is frequently part of the drama and the director is constantly inviting the audience to 'come back stage' to see what is going on.

Expansive education is for all students of whatever age. And, regardless of age, learners in expansive classrooms can expect to play many new roles. They can be the designer or co-designer of the lesson or part of it. They can act as peer teachers. They can be coaches to each other and mentors to younger or less skilled students. They can be 'inspectors', trained to give their teachers feedback in ways which are formatively useful and appropriately respectful. They can even be educational researchers undertaking not just curricular enquiries but also actively being recruited to understand

more about the learning processes in which they are involved – for example, monitoring their own levels of focus/distractibility, trying out and evaluating different methods of learning the same content, or experimenting with different kinds of questioning techniques and noticing the results.

Expansive learning environments

We have already seen how much context and culture matters (see pages xx) and this is bound to be important in the classrooms, studios, workshops, laboratories and music rooms in which students. While the physical setting may be very different according to location in the world and age of child, there are two abiding characteristics of successful expansive learning environments. They are stretching and feedback rich.

By stretching we mean that the way they are set out is designed to stretch all who learn there. At its simplest this might be a poster with the question: ‘How could you make what you have just done harder for yourself?’ Or, using technology, it might be that it is easy for students who have completed a task at one level can quickly transfer their attentions to the next level up.

By feedback-rich we mean that everything about the environment encourages critical reflection on progress. Here a simple example might be a display of work in progress, helpfully annotated in another colour by both students and teacher alike with feedback comments for all to see and learn from.

Perhaps the most apt image for expansive classroom is of a ‘mind gym’.³ The exercise machines are subjects, topics and activities, and the fitness coaches who work in this space are helping you to exercise not your physical but your mental ‘muscles’.

Ron Ritchhart has a nice phrase to describe the kinds of places we are trying to conjure up. He calls them ‘thoughtful environments’⁴. He notes a number of important characteristics. Thoughtful environments encourage a focus on big ideas that are important to the subject being studied, thus making the investment of time and effort worthwhile. The learning offered in them captures the interest of students and provides them with some degree of autonomy and choice. And always in these places there is a teacher who is modeling his or her own interests in whichever disposition is being cultivated.

In expansive environments one word needs to be used especially carefully – ability. This word can so easily slip into becoming a synonym for ‘talent’ or ‘intelligence’. But worse still, as Carol Dweck’s work on mindsets has made clear, the use of ability as a concept can become almost indistinguishable from a belief that ability is largely fixed. Even if the adverb ‘currently’ is used as a prefix to descriptions of progress such as ‘currently less able’ or, perhaps, more plausibly, ‘currently achieving a level x in y’, the force of the word ‘ability’ in a school environment is often used to prejudice future progress. Very few schools manage to create learning groupings which are genuinely fluid and regularly changed. Yet it is only when this happens that pupils have any empirical sense that being placed in a set is anything other than a judgment on their prospects.

Let's go back to our ten questions for a moment and ponder how a learning environment might be organized to promote expansive education.

1. Growth mindsets – posters throughout the school of people who have had to struggle to succeed.
2. Authenticity – where vocational subjects are taught in an environment that is really like ‘the real thing’.
3. The centrality of enquiry – walls in each classroom carry examples of question to which the teacher does not know the answer.
4. Theory and practice – glass walls which enable expert students to be observed and teachers to make theoretical observations to help other learners without unnecessary interruptions
5. Expanded time – rooms which allow students to meet together for short plenary sessions in relatively large numbers and then have many break-out spaces for learning to continue for longer chunks of time
6. Using tools – spaces which encourage learners to move around to make use of tools as and when they need them
7. Group work – Flexible arrangements of tables and chairs, along with small spaces, which allow different permutations of group size easily and time effectively to work together
8. Visible learning – displays and conversations which explicitly show the processes of learning
9. The virtual world – access to high-quality web resources available before and after school hours
10. Facilitated learning – Well sign-posted opportunities throughout the school for independent learning along with clear indications of where resources can be found to facilitate this.

A decision-making framework for expansive pedagogy

If you are still reading this far into the book we'd like to think that you must be at least partially persuaded by some of the science, or have found something in our stories from expansive pioneers that speaks to you. We hope that you share at least some of our four broad hoped for outcomes for expansive education. If you do, we believe that the emerging evidence we and others are uncovering means that you are in good company.

But let's suppose you are a teacher and wanting to change your practice to become more expansive. What do you do? In the rest of this chapter we explore the choices which all teachers face when they want to shift their practice in the directions we and our pioneering friends are suggesting.

We started this chapter by suggesting that pedagogy is essentially a set of decisions which teachers and course designers take to orchestrate teaching and learning to achieve their desired outcomes.

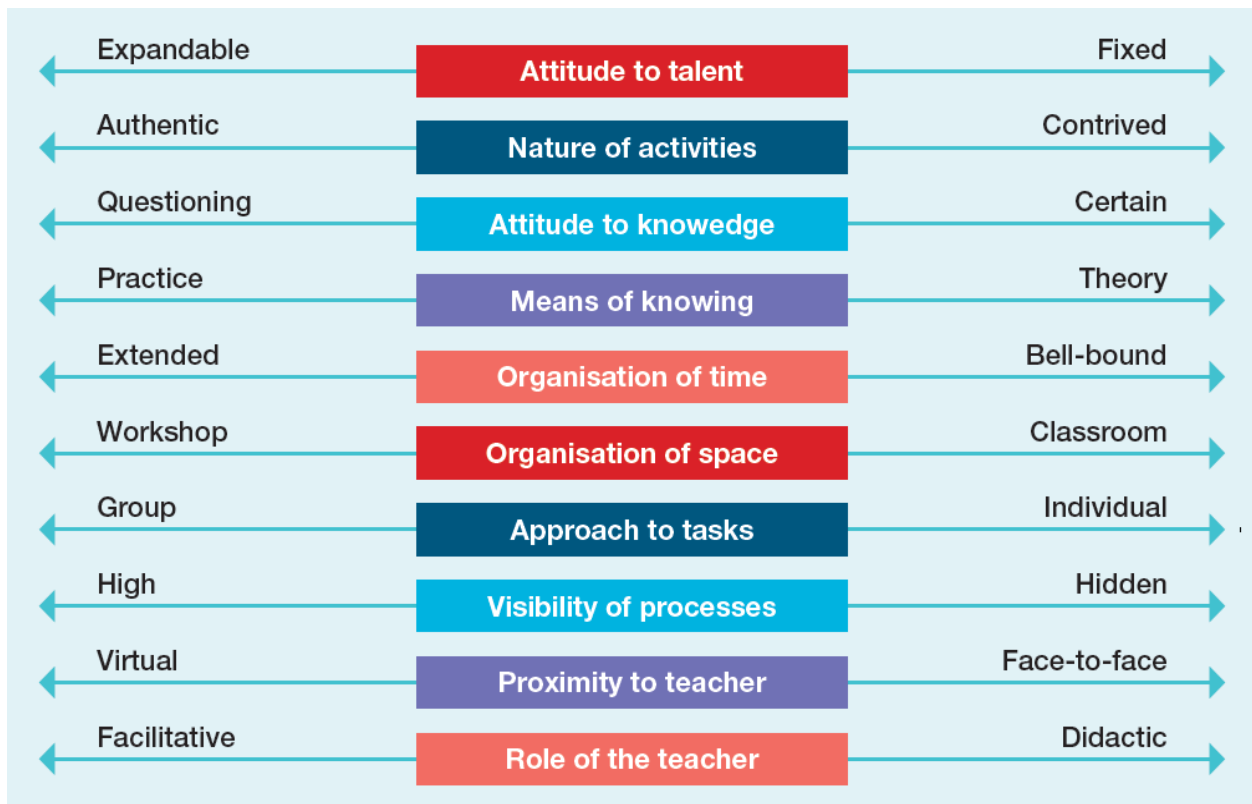
We think there are ten key decisions which teachers have to take and we have expressed these as a series of continua in the figure below.

While it might be tempting to assume that one end of each line is right and the other wrong, or one end better than the other, this is rarely the case. Most of these decisions are much more subtle.

Where you 'place' yourself on any one line will depend on:

- The resources available to you
- The learners you are teaching
- The knowledge content you are seeking to explore
- The dispositions you are seeking to cultivate, and
- Your own confidence.

These are the elements, which taken together, make up the context of your teaching and learning.



It is important to stress that this tool is not suggesting that these are binary, either-or decisions. Rather the tool simply helps teachers to think about when one end of each of the choices may be more appropriate to adopt. Often it may be easier to plot a position somewhere along the continuum.

So, for example, when a teacher is considering their own role, they will want to be thinking about which situations call for a more didactic approach and which will tend to be more effective if introduced in a more facilitative way.

Nevertheless there has been a shift in thinking about pedagogic practice which is moving broadly to the left of our figure and this is especially the case for those wishing to teach more expansively.

The phrases below below indicates the kind of ‘palette’ from which teachers create their lessons and courses and the sort of approaches (colours) from which they tend to depend.

Watching and imitating	Practising	Talking it out	Enquiry
Giving & receiving feedback	Peer teaching	Coaching	Being coached
Problem-solving	Listening	Drafting	Reflecting
On the fly	Virtually	Simulation	Games
Competing	Performing	Community	Extended projects

Unsurprisingly, expansive educators and their students tend to see it as part of their mission constantly to widen the range of possible learning methods, ensuring that learners have more choices as they go about their learning. Powerful learners can describe methods clearly to others and discuss the relative usefulness of different approaches and frequently they will not be using a single approach but be combining methods.

And it is important to remember, too, that an understanding of methods is not sufficient of itself. For it is often the way the method is used that is at least as important as the method itself. For example, we know of many schools adopting some kind of extended project. Some set this up in ways which are genuinely interdisciplinary, encourage high levels of student engagement, empower learners to plan their own routes through and build in well-planned critique and reflection sessions. While others use the same ‘project’ each year and leave very little genuine opportunities for collaboration, enquiry and personalization to their students.

For each of our ten areas we now try to bring together key lines of thinking, consider implications for pedagogy and map these on to the four desirable outcomes we have established for expansive education:

1. Routine capability and its associated dispositions and expertise
2. Non-routine capability and the necessary resourcefulness to adapt existing learning to novel or unexpected contexts
3. The pride and determination that goes with an ethic of excellence, and
4. The wider dispositions for lifelong learning.

Always we will want to be thinking about the degree to which choices can be made which genuinely prepare learners for the real world in which they will spend their lives (of which doing well at tests and examinations is only a part of a bigger picture).

Sometimes we will want to focus on a particular method, such as, for example, the philosophical enquiry which we described on page xx or, more broadly, for example, on the set of practices often referred to as problem-based learning.

On other occasions we will try to bring together the material to see to what extent we can make any useful generalisations about the choices that teachers make.

Attitude to talent – expandable or fixed

Whether you are successful or not in the real world depends to a large degree on how hard you have pushed yourself, how you have dealt with set-backs and how good you are at staying positive. And whether you possess these dispositions or not, as we have seen from Carol Dweck's research and from the results of the interventions led by Mindset Works (see page xx), is hugely influenced by the kind of mindset learners have.

Those with a growth mindset see the making of mistakes as an indicator of effective learning. They enjoy stretching themselves and are always looking to see how they could be 'even better if...'. Whereas those with fixed mindsets are more risk-averse and, wrongly thinking that their talent is innate, see little value in practicing and putting in effort. For they ascribe their success or failure in life (like their height or their eye colour) to their genes. Indeed they can be effort averse believing that if you have ability you should not need to exert effort. In the real world resilience is most often called for when the situation being encountered is either very difficult or more often simply non-routine and, therefore, novel.

There are a number of profound general pedagogic design principles which follow from this body of research.

First, teachers talk to students in ways which transmit a belief in the learner's potential. Rather than reporting that student x has not mastered something, expansive teachers will prefer to say that student x has not 'yet' mastered it, unambiguously stressing the likelihood that they will do so. Even when something has been mastered the assumption will always be that there is a next stage and a next stage to achieve.

But such stretching views of what is possible bring with them great challenge. So, secondly, the teacher, therefore, seeks to provide support or scaffolding for learners to set ambitious goals but receive appropriate support. Strategies abound for dealing with setbacks and building resilience. A BLP example of this is the 'stuck poster' which students develop as an aide memoire for themselves to prompt course of action when they get stuck. If you have ever watched the television programme 'Who wants to be a millionaire' you'll recognise the kind of things that resilient learners do when momentarily stuck. They go 50-50, narrowing the odds. They phone a friend (the equivalent to using

the Internet as most ‘friends’ are simultaneously online). Or they ask the audience (like getting help with homework from your peer group at school).

Thirdly, expansive teachers who understand this core principle of growth see learning from mistakes as one of the most powerful tools in their pedagogic tool box. Teachers invite learners to see constructive criticism as an important means of learning not as something to be avoided out of embarrassment. They model how this might be done and give opportunities for simulation and role-playing. They admit to their own mistakes in life and what they have learned from them. They often share worked examples on the White Board, inviting group critical feedback.

Fourthly, teachers who see the power of growth mindsets may choose to offer a specific kind of support called ‘deliberate practice’⁵. Deliberate practice is good practicing, practice which really helps you get better at something, whether you are learning a musical instrument, practising diving or using idiomatic French. Elsewhere we have described five elements to this kind of practising⁶:

1. ‘getting the feel’ - over time, the body establishes a template of how it ‘feels’ when the action seems to be going well.
2. ‘automating’ - until ‘muscle memory’ has been established and the learner is able to execute the skills to the point when conscious thought is no longer required for each element of the action.
3. ‘picking out the hard parts’ - when an action does not lead to the desired outcome, the learner deconstructs that action to consider at which part the process went wrong
4. ‘improvising’ - effective practice can involve a level of playfulness in trying new ways of working to avoid things becoming staid.
5. ‘doing it for real’: skills become refined when they are tested in real-life situations which may be competitive, stressful, or pressured in some way.

There are many other ways of practising, widely used professionally in the arts and in sports from which teachers can learn.

Nature of activities – authentic or contrived

If your goal is to prepare learners for the real world, then schools may well cause you a problem, as the now famous description of school versus real-world learning by Lauren Resnick made clear on page xx. For one of the major differences between schools and the world outside is the authenticity of the tasks which learners undertake.

In the real world I learn about gas boilers when I need to buy one or mine has broken down or about tree-planting because I need to screen an area from the sun or about good fiction writers for young people because I have an eight year old daughter. In such situations I need immediate access to reference materials, to experts and to specialist expertise. My motivation is clear. I want to do something I can’t do now. I am, in the broadest sense, trying to solve a problem.

Or it may be a more general or more complex issue I am addressing. I want to extend my circle of friends. I am worried about my health. I want to do something to help a family member who is going

through difficult times. These examples are much messier and less well-defined and will call for some preliminary sounding out, finding out, searching and thinking.

Schools are not much like either of these two sets of examples. Instead their defining entry points tend to be the subjects which go to make up a school's timetable or curriculum. But schools could be a lot closer to life outside if they chose to be so!

David Perkins describes some of the tensions between real world and school world really helpfully in *Making Learning Whole*⁷. He makes a compelling case as to why and how schools can teach the whole game of learning (in other words closer to the one we encounter in the real world). He puts his finger beautifully on two aberrations common in schools which he calls 'elementitis' and 'aboutitis'. Both conspire to keep young people away from the world. Elementitis is the habit of breaking complex subjects up into meaningless chunks (learning the game of Scrabble, say, by listing from a dictionary four letter words beginning with 'p'). While aboutitis is the tendency to teach about interesting ideas rather than seeing whether they work in practice. A good example of this was the way some teachers taught students about the idea of Howard Gardner's eight multiple intelligence and students then coloured in an imaginary profile of their strengths. Well-intentioned as this doubtless was it did not help students to understand the deep and interesting ideas behind the theory but rather assume that such aspects of intelligence were, like IQ, largely fixed.

Perkins offers us seven principles of whole game learning of which we quote the first two:

1. Play the whole game – use extended projects and authentic contexts
2. Make the game worth playing – work hard at engaging learners giving them choices wherever possible.⁸

Methods which clearly fall into these two categories include: watching, imitating, enquiry, problem-solving, extended project work, competing and performing, although even these can intentionally or unintentionally be subverted to come across as contrived in the wrong hands!

Attitude to knowledge – questioning or certain

In much school learning questions are asked and answers are given. There is often one correct answer. But as we get older and live our lives we realise that they really interesting issues in life often have many interpretations. Take the underlying question in this book about the purpose of school. There are many possible standpoints and ours is just one interpretation or approach.

Yet even when the subject is complex and interesting teachers often speak with a certainty that brooks no challenge or leaves no room for subtlety. Why is this? Are we learning at an early period of our professional formation that teachers are always right? Are we afraid that an admission of not knowingness would be a badge of shame?

In chapter 2 we encountered Ellen Langer's research which is pivotal here. Langer uses the concept of mindfulness to describe rich facilitative learning environments of the kind we are seeking to create in studio learning:

‘A mindful approach to any activity has three characteristics: the continuous creation of new categories; openness to new information and an implicit awareness of more than one perspective.’⁹

Langer has shown that small shifts in a teacher’s language can induce a marked change in the learning habits that students are bringing to bear on their work. Specifically, if a teacher says definitively that something *is* the case, students take it literally and try to remember it. But if a teacher says, of the same thing, that it *could be* the case, they become more engaged, more thoughtful, more imaginative and more critical. ‘Could be’ language invites learners to become more active, inquisitive members of the knowledge-checking, knowledge-developing community, rather than to see themselves as ‘merely’ doing their best to understand and remember something that is already cut and dried.

David Perkins and colleagues go further still arguing that:

‘conditional instruction opens up possibilities, whereas absolute instruction tends to produce a more rigid mindset about the information’¹⁰.

In this way, the teacher contributes to a mindful disposition and intelligent behaviour.

Such tentative language suggests a more facilitative approach, one that invites multiple opinions, creates compelling environments in which learners can explore complex issues and frequently find it impossible to answer learners’ questions definitively. It assumes that there will be many answers to most questions.

Of course there are many occasions when certainty is smart. When life is endangered. When dealing with some aspects of morality. When multiplying in base 10 and expecting that 2×2 will equal 4 and so on. But in the humanities, in the arts, and when dealing with literature multiple perspectives are to be expected. And there are questions of science and mathematics where we are still seeking answers and have only theories to offer at this stage.

Methods which encourage talking things out, enquiry, listening, drafting and giving and receiving feedback are likely to be sympathetic to a view of knowledge that assumes there will, on many occasions, be several different answers.

Means of knowing – practice or theory

Earlier in chapter 2 we mentioned David Kolb as the researcher credited with the creation of the experiential cycle. We learn, he suggests, in a cycle which moves from concrete experience through reflective observation and abstract conceptualisation to active experimentation. And he is right for some situations. A child touches a hot log in an open fire for the first time and observes and reflects with a cry of pain. Later she speculates that the burning part is, perhaps, part of a dragon or, like blood in stories, not necessarily a nice thing. She may go on to experiment and find out whether all wood in fires is painfully hot or she may have reached a compelling abstract theory that fire causes heat and wood burns and causes heat and have decided that wood in fires is to be avoided.

Or maybe the child never touches burning wood because she has earlier on had the idea of fire and heat explained so persuasively that she does not need to try it out for herself. Even in this relatively simple example it is becoming clear that there is no universally reliable experiential learning cycle! When one requires theory and when first-hand experience is better is a complex matter depending on what is being learned, levels of experience, available resources and the broader context.

In expansive education it is almost always the case that teachers will be using a blend of practical methods such as imitating, practising, sketching, problem-solving and extended project work as well as those which are more theoretical. Nevertheless there is a presumption for expansive educators that, where possible, experiential opportunities will be sought with theory being offered as and when needed. Too often theory is offered in chunks which are too big and too separate from practice, rather than, say, just before learning something, during the process of learning it via feedback of after the learning is completed through reflective conversations.

Having a theoretical understanding is an essential part of the development of more complex learning outcomes such as the ability to deal with non-routine situations or the transfer of learning from one context to another. For in both these examples learners need to be able to see patterns, models, connections in order to be able to access something learned in the past. We know, for example, from the work of David Perkins and Gavriel Salomon that transfer is assisted by:

- extensive practice in different contexts
- specifically encouraging learners to consider how they might use what they are learning in other contexts at the point when they first learn something
- making as many connections as possible to the learner's *existing* knowledge, and, in the context of what we are discussing here, through
- the provision of clear models, explanations and mental models at the point of first learning a new skill.¹¹

Extensive practice in different contexts helps to develop resourcefulness, so that, to use a sporting metaphor, when a team plays away from home it is not thrown by the unfamiliarity of the ground. Specifically considering possible other uses of something you are learning when you first learn invites you to really think what kind of thing it is you are learning and often moves it out of the domain of a subject to become a useful disposition.

So, back to the sports field for a moment, developing strategies for not getting upset when the opposing team scores a goal is a form emotional self-management which, seen as such, is pretty similar to what you may have to do when you get stuck on a difficult maths question in a test. Connecting to the prior experiences of learners helps to ensure that their engagement is higher and that they are already being able to see, abstractly, that what they are learning is something like something else they know. And all of this is facilitated by the possession of mental models and rules which assist both transfer and more unconscious recall in less familiar situations. (What was it that helps when things suddenly go wrong? Ah yes, some way of delaying my response to give me some breathing space. I'll hold my breath and count to ten.)

Organisation of time – extended or bell-bound

The unit of work in the real world is a day not an hour long lesson and almost every teacher we know will admit to the frustration of the bell going just when things are getting interesting. It takes time to become immersed in learning and go deeper. Indeed some of our pioneers in chapter 3 have made this a cornerstone of their educational philosophy, so important do they consider this aspect of expansive teaching to be (see page xx).

For something happens to the quality of our engagement engendered when we are engaged in learning for an extended period of time. Mihaly Csikszentmihalyi has studied this phenomenon extensively and coined the word ‘flow’ to describe the state of mind which learners can achieve if they are deeply absorbed in their learning. He describes this as an optimal experience in which learners find deep fulfilment and in which they become unaware of time¹². To achieve the state of flow three things need to be in place: the task needs to be sufficiently demanding and engaging, the learner needs to have enough skill to be able to tackle the task without undue anxiety or stress and there needs to be sufficient time available.

There is clear evidence from Csikszentmihalyi’s research that the quality of creativity increases when we are in a state of flow and that the experience of flow is itself inherently beneficial to the learner who finds such experiences enjoyable and rewarding. Experiences like this do not come easily or when an individual is consciously relaxing. Rather they involve, to use Csikszentmihalyi’s own words,:

*painful, risky, difficult activities that stretched the person’s capacity and involved an element of novelty and discovery.*¹³

The state of flow is not unlike Ellen Langer’s concept of mindfulness in the sense that certain qualities of mind – effortless focus and absorption – are being cultivated.

And, in terms of our conception of expansive learning and decisions about the organization of time, we hypothesize that such deeper learning states are much more likely to occur within longer time frames. There are undoubtedly other potential benefits for learners of extended work. After extensive research into creativity, Lars Lindström¹⁴ suggests, for example, that the disposition of creativity is fostered through investigative work that develops when students have opportunities to work on an assignment over an extended period of time.

In Lois Hetland’s work on studio learning at Project Zero,¹⁵ projects often extended over a whole day and were carried out over a period of weeks. She links such extended periods of learning with increased engagement and persistence in learners. In most busy schools, the norm is for constant bell-induced interruptions. Yet a picture of expansive learning is already emerging of constructivist, authentic learning which demands that problems be teased out by learners over more time than is typically allowed.

Extended projects clearly help as do ways of engaging with learners outside the school and the school day, encouraging their activities to spill out beyond the end of classes and beyond the school gates into their homes and into the community. Different curriculum design is often called for and

many of the competence-based pioneers mentioned in chapter 3 have adopted timetables which facilitate learning in larger blocks of time. But even where such structural changes are not possible, teachers with an expansive mindset can help to transcend the compartmentalisation of the curriculum by explicitly expanding horizon and always suggesting ways in which connections can be made.

Organisation of space and resources - workshop or classroom

We have already made some general observations about how spaces can promote expansive thinking. So, for example, if tools are locked away in cupboards it suggests that tools are controlled by the teacher rather than freely accessible. If dictionaries are stored on high shelves, it implies that pupils must ask the teacher before using one. If work in progress can be left out safely, then it might suggest that this interim stage of design was seen as a useful part of the process of making something. If drawers and cupboards are clearly labelled it might be assumed that students are to be encouraged to be resourceful and explore and use their contents. And so on.

We surmise that, just as one of the defining characteristics of Homo sapiens is our ability to create new tools, so one of the most important aspects of real-world learning is the ability to see what any new environment affords in terms of tools and human resources and then use them to best effect. Consequently we imagine that a workshop environment is more likely to encourage exploration, experimentation, tinkering, proto-typing etc.

Teachers use space to underscore their learning intentions and personal belief sets. In characterising the physical organization of space for expansive learning we hope to make clear that the kinds of learning dispositions we are hoping to cultivate are the kinds we have been exploring throughout this book. We should, as Roy Pea suggests:

*reorient the educational emphasis from individual, tool-free cognition to facilitating individuals' responsive and novel uses of resources for creative and intelligent activity alone and in collaboration.*¹⁶

Learning methods which are obviously 'workshop' based include watching, imitating, practising, drafting, sketching, conversation, reflecting – the kinds of things which happen naturally when a group of makers or artists are working in the same space and naturally curious to see how each other's endeavours are progressing.

Of central importance in thinking about expansive pedagogy is the desirability of providing opportunities for 'work in progress' to be stored, shown and seen and explored by other students. In an ideal world teachers will choose to model their own creative or learning endeavours by sharing their works in progress too, either literally, or through descriptions of their own learning.

Approach to tasks – group or individual

In the real world team-work is an essential way of working and learning. The ability to work collaboratively in groups to solve problems is one of the attributes cited by employers across the world as highly desirable. In almost all expansive curricula it is listed as a desired outcome of

education¹⁷. Of course we do not mean to suggest that individual learning is not valued; just that, in schools, individual performance tends to be emphasised rather than collaborative endeavour – certainly when it comes to assessment.

As we saw in chapter 2, John Dewey argued strongly for a more cooperative approach to learning, variously using phrases like ‘cooperative intelligence’ and ‘collective intelligence’ a century ago. Dewey explained this by suggesting that for knowledge to be in any real sense useful it has to have expression in relationships and social activity. No man or woman is an island.¹⁸

As well as the social intelligence implied by watching and noticing others there is a specific way that young people can help each other. Normally referred to as peer learning, this kind of group working occurs when learners explicitly seek to learn from and with each other. David Boud’s description makes this clear:

*Students learn a great deal by explaining their ideas to others and by participating in activities in which they can learn from their peers.*¹⁹

Through the research of Jean Lave and Etienne Wenger²⁰ we have already seen in chapter 2 how groups work and learn together. And as they work and solve problems together, so their learning habits and attitudes rub off on each other. New members watch carefully how the more established members talk, respond and deal with challenges, like children do when they want to join someone’s ‘gang’. This stage of ‘legitimate peripheral participation’ is an important element of expansive education.

Ikseon Choi and colleagues propose that peer interactions can guide and facilitate metacognitive activities, allowing existing knowledge to be re-constructed in their mind. In this way, peer interactions, particularly verbal interactions, have the potential to ‘expand learners’ awareness of what they need to learn²¹. And we saw earlier in this chapter some of the benefits of creating a classroom community of learners.

In terms of pedagogy there is too often a lack of precision about exactly what is involved in any group process: what the roles to be played are, and how these will be developed and assessed. Group working provides the simplest way for us to learn by watching others. A student watches the way one of her peers is starting to make a bird-box or paint a picture and tries to do it similarly. And teachers offer templates – techniques, tools, patterns of behaviour – for students to copy and make their own. Albert Bandura’s work has explored the way we observe behaviour and its outcomes and then imitate (or avoid) what we observe. In Bandura’s analysis we cannot escape the fact that we are all learning role models for each other. Bandura described the conditions necessary for effective imitation and modelling. First of all the learner must notice what is being modelled. Then she must remember and retain what has been noticed. And finally she must be able *and* willing to reproduce a desired behaviour. As Bandura nicely put it:

Learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Fortunately, most human

*behaviour is learned observationally through modelling: from observing others one forms an idea of how new behaviours are performed, and on later occasions this coded information serves as a guide for action.*²²

There are a number of approaches to group working used in schools which expansive educators may wish to explore of which these are two kinds:

- The Group Investigation method emphasises a system of small groups, design of tasks requiring participation of each member, cooperation to accomplish its goals, synthesis of member contributions and an end presentation. Jigsaw learning is a good example in this tradition.²³
- De Bono's '6 Thinking Hats'²⁴ is a widely used example and illustrative of the way in which by clearly delineating roles within groups, certain patterns of thinking and acting can be encouraged.

In the digital age, schools are also beginning to consider how best to create opportunities for online group working that is educational and safe (see later in this chapter on page xx). Out of school it is clear to see, for example, the high-levels of engagement engendered in online games played by young people who are connected to other players in real time across the world.

A begged question in most education systems is the issue of group assessment. Group work is hugely valued in life but at school there is a feeling that it is somehow not fair, a form of cheating even (how will I know who has done the real work?). But until such collective endeavour is assessed it is likely to remain valued on more on the sports pitch and in the concert hall than as an integral part of learning in classrooms.

Visibility of processes – high or hidden

Buildings used to hide their central heating ducts and lighting cables until the Pompidou Centre in Paris made a feature of them. Well-made plays used to pride themselves in hiding all aspects of stagecraft from the audience. Now plays such as Michael Frayn's *Noises Off*²⁵ make drama out of those hidden activities. And teachers used to think that they should keep many of the processes and methods of learning hidden and focus on the content and subject in hand - until recently that is. We have known for fifty years that understanding more about the processes of our learning, sometimes called meta-cognition or meta-learning, was potentially a useful thing for learners to do. And in the last decade, study after study have made explicit connections between understanding the processes of learning and the development of successful learning dispositions (as well as higher achievement).

Robert Sternberg, creator of the concept of 'successful intelligence', has developed a theory that makes explicit the links between intelligence and meta-cognition. As he puts it, metacognition is the executive process which people use for:

*figuring out how to do a particular task or set of tasks, and then making sure that the task or set of tasks are done correctly.*²⁶

David Perkins has similarly homed in on this executive process which is capable of turning a thought into an action, or skill into a disposition with the phrase 'reflective intelligence'²⁷. We need to be able

to recognise when it is appropriate to deploy certain kinds of thinking skills, to be sensitive to the occasion.

The title of John Hattie's book - *Visible Learning* - already mentioned on several occasions, speaks for itself. And he is explicit about his central contention in its early pages:

*It is critical that teaching and learning are visible. There is no deep secret called 'teaching and learning'; teaching and learning are visible in the classrooms of successful teachers and students...What is most important is that the teaching is visible to the student and learning is visible to the teacher.*²⁸

The more that learners see what is going on as they are learning it, the better they will be able to understand and apply it in different contexts. Methods which invite high visibility of processes and focus on the 'how' of learning include watching and imitating, coaching, reflection and feedback. But any topic can be taught in a way that takes the student inside the mind of the learner and makes their learning processes explicit.

Proximity to teacher – virtual or face to face

In today's networked world most of us are connected via the Internet and its many social networking sites to many others on many occasions during any typical day. Through such methods our horizons have undoubtedly been expanded.

Indeed the Internet is forcing us to rethink the way we use the 'face time' we have at school. Certainly in terms of pedagogy, the virtual environment is a relatively new context for learning and lends itself to different habits of mind. You can stop and start a TED lecture more easily than you can your teacher! Searching for information in your own time and your own way is the norm on the web. Well-honed scepticism is essential to distinguish good and bad, reliable and unreliable sources of information on the internet, while your classroom teacher should (in a perfect world at least) be unimpeachable. Through surfing it may be far easier to see patterns and connections than ever before. Visual imagery is everywhere: with Google Earth, even what were once 2-dimensional maps now provide 360° photographs of places.

In an educational context one innovation beginning to be used in vocational education is flipped teaching. Drawing on work by Eric Mazur, the 'flip' here is to assume that, with technology, much of the lecturing and instruction can be done outside the classroom and time at college or school can be focused on higher order interactions between teacher and learner²⁹. This kind of approach would seem to be a significant element of a contemporary approach to developing an expansive pedagogy.

Online worlds also allow opportunities for simulation, game-playing, trial and error, safe practising and, increasingly, for peer teaching. A good example of the latter is the Khan Academy³⁰, a free online education platform created by Salman Khan from a small office in his home, which now has thousands of video lessons teaching a wide spectrum of subjects.

For two decades education has argued about the benefits or otherwise of virtual learning, often producing strong advocates for and against it, sometimes contrasting it unfavourably with face to face models of teaching, sometimes promoting it to such a degree that it becomes mindless cutting and pasting. A real debate is now happening at last and may enable us to get under the skin of virtual learning. For like 'real' learning, it is prone to many of the same issues. Simply using it does not make you a better teacher or a more expansive learner. It is how you use it that counts.

The questions virtual learning raise for expansive educators include:

How can I use the virtual world to help my students:

- develop the dispositions I want them to acquire?
- reinforce the beliefs they have about the expandability of their intelligence?
- access worlds beyond the school gates?

The role of the teacher – facilitative or didactic

From the moment teachers enter a room full of students they are faced with choices about the role they play. They can be strict or lenient, serious or jokey, distant or accessible, quiet or loud and so on. But their decision about their overall approach, whether it is mainly facilitative or largely didactic really matters. For it says much about their approach to knowledge, to learning and to learners. While being facilitative or being didactic may appear at first to be a straight choice of style, in reality it is more complex than the choices we have just listed.

The idea of the teacher as facilitator is not new: it has been explicitly part of an approach to learning referred to as 'constructivist' for some hundred years. From a constructivist perspective, learning is created by an interaction between people's ideas and their experiences with other people. The goal of any learning intervention is the generation of new knowledge in collaboration with others. Such an approach requires resourcefulness and group-working skills in large measure. The core principles of the constructivist approach have been usefully summarised by John Savery and Thomas Duffy³¹ and include the creation of authentic tasks which are anchored to the real world, high levels of ownership by learners of the tasks they undertake, learning environments which support and challenge learners' thinking and opportunities for learners to select as they develop alternative ideas and strategies.

Thus far you might assume research suggests that expansive teaching is always best when facilitative. Not so. There are those who challenge the constructivist approach. So, for example, Paul Kirschner and colleagues ask us think more carefully about *when* teacher guidance rather than freer facilitative approaches are beneficial. They argue that the architecture of the brain, specifically the processes of long-term and working memory, sometimes demands clear instruction rather than endless problem-based approaches. To be expert problem-solvers, they remind us, we need plenty of experiences stored in long-term memory and we need to be able to access these.

More facilitative styles of enquiry or problem-based learning require more short-term memory capacity and may thus leave less capacity available for thinking and learning. They conclude: ‘Controlled experiments almost uniformly indicate that, when dealing with novel information, learners should be explicitly shown what to do and how to do it.’³² But we need to be careful to balance the aim of learning correct answers and procedures with the goal of developing independent learning dispositions. There is an even more powerful argument for the value of some kinds of didactic teaching which most of us will have in our memory bank. Think not of a teacher holding forth but of a really persuasive expert teacher demonstrating a complex craft or skill. Couple this with the compelling narrative and explanation they might offer us of what is being done and why, and you have the essence of the expert/apprentice/novice tradition of instruction.

Many people can recall such electrifyingly learning moments from their own school lives. Providing the processes of learning are made visible then these kinds of teacherly expositions are a different kind of didacticism from what is sometimes referred to today as the ‘sage on the stage’ (a teacher talking for a long time at students). It is a kind of cognitive apprenticeship which sits very comfortably within studio learning. Lois Hetland and colleagues at Harvard’s Project Zero describe clearly the value of what they call the ‘demonstration lecture’, ‘a brief, visually rich lecture by the teacher to the class (or to a small group) that conveys information that students will use immediately’. Such moments of didacticism work, the Project Zero research suggests, because they are focused, efficient, visually engaging, of immediate relevance, short and connected to skills and concepts *already* introduced³³.

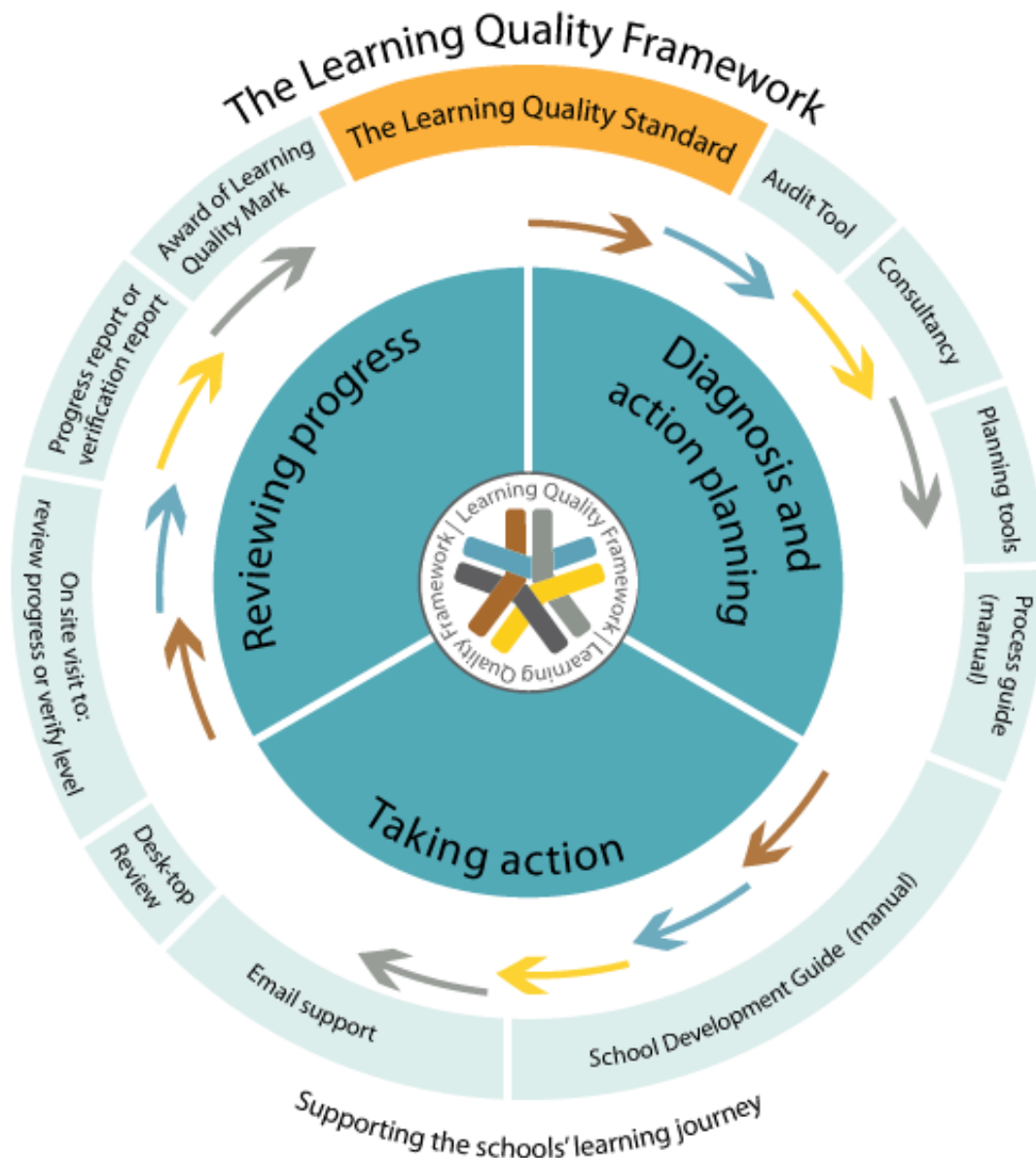
And the flip side of a change in teacher roles is a concomitant shift in what learners do. For what they do really matters. They need to be able to teach themselves and others, be resourceful, set challenging goals, give and receive feedback and generally be part of a classroom learning community.

A new framework for learning?

As a school tries to become more expansive, there is a lot to think about. Classroom pedagogy has to change, and that means systems of support and accountability – new kinds of professional development - may need to be devised and monitored. Subjects may be blended into themes and topics, and the structure of the timetable may well change as a result. Parents may need to be brought on side, and digital technology configured so that its use genuinely supports more independent and collaborative learning. And so on.

As a result of a recent evaluation of a group of the Building Learning Power schools,³⁴ Maryl Chambers and her colleagues at The Learning Organisation (TLO) have developed a multi-layered route-map, the Learning Quality Framework, to help school leaders plan and keep track of the constituent changes that add up to a more expansive learning environment. We think it might be useful to other expansive educators if we say a little more about the structure of this tool here.³⁵

The Learning Quality Framework



The LQF describes twelve layers of change that contribute to moving a school in an expansive direction. They are:

1. Vision for Learning

An engaging vision for 21st Century education based on social, economic, moral and personal learning imperatives guides the development of the school and its community.

2. A Framework for Learning

A coherent approach to developing learning dispositions drives learning in the school and its community.

3. A Language for Learning

A rich language of learning permeates learning across the school and its community. The learning school develops, uses and extends a rich and dynamic language to talk about learning. Effective learning requires emotional engagement, a wide range of cognitive approaches, interpersonal interaction and personal responsibility. The language of learning that embraces all these dimensions is used to shape, and improve learning in the school.

4. Leading Innovation in Learning

Leadership for learning throughout the school supports innovation, experimentation and risk taking, building individual independence and responsibility in both staff and students.

5. Professional Development (PD) Policy and Strategy

PD policy and strategy embraces a range of professional learning activities that stimulates and supports communities of enquiry and research in the promotion of effective learning habits for all.

6. Curriculum Design

The curriculum is effective in cultivating and progressing a set of generic learning habits and attitudes.

7. Teaching Methodology (Pedagogy)

Learning opportunities intrigue and motivate learners, develop effective learning habits, and enhance content acquisition.

8. The Learning Environment

The Learning Environment is used constructively to promote positive learning behaviours and reinforce messages about the nature of learning.

9. Learner Engagement

Young people actively co-participate in the design, management and evaluation of learning and contribute to the powerful learning culture.

10. Parents and Community

The school works in partnership with parents and carers to develop learning dispositions.

11. Assessing for Learning

Tracking and authenticating the growth of learning dispositions (with regard to when, where and how well they are used) builds learners' motivation and informs learning design.

12. Evaluating the Learning Organisation

A monitored set of organisational learning indicators guides continual improvement in provision, practice and the achievement of objectives.

But it is not enough to have identified some of the facets of a school that can be recruited to support expansive culture change: you need to know what change in each of those layers actually looks like. How do you know how well you are doing already, in terms of recruiting parents' sympathy, for example? How is progress to be planned for, and recognised when it happens? So the LQF offers a school leadership team a series of snapshots of what the next 'level' at each of the layers would look like, as well as a range of suggestions for activities that can help to move the school to the next level.

These are headlines only but they may serve to illustrate how the LQF offer a bigger context into which expansive pedagogy fits, and how useful it can be in supporting the journey towards providing a genuinely more expansive education. More information can be found on www.learningqualityframework.co.uk.

We leave the last words in this chapter to one of our pioneers, The Curriculum Foundation:

Schools and nations do not have to choose between high standards within subjects, and an education that prepares young people for life. It is possible to have both. An expansive curriculum can excite imaginations, widen horizons, raise aspirations, inspire creativity, deepen subject understanding and can lay the roots of life-long learning. It can send all young people out into the world with the confidence, the ability and the desire to make that world a better place.

References

-
- ¹ Two pieces of research are particularly important. The first, funded by the Esmée Fairbairn Foundation, has been published as Lucas, B., Claxton, G. and Spencer, E. (2012) *Making It: Studio Teaching and its impact on teachers and learners* Winchester: University of Winchester. The second, funded by the City and Guilds Centre for Skills Development is Lucas, B., Spencer, E. and Claxton, G. (2012) *How to teach vocational education: A theory of vocational pedagogy*. London: the City and Guilds Centre for Skills Development
- ² Hattie, J. (2012) *Visible Learning for teachers: maximising impact on learning*. London: Routledge
- ³ Not to be confused with 'brain gym', a proprietary method of supposedly increasing the connectivity of the brain through physical exercises.
- ⁴ Ritchhart, R. (2002) *Intellectual character: what it is, why it matters and how to get it*. San Francisco, CA: Jossey-Bass (p145)
- ⁵ This phrase was coined by Anders Ericsson, see for example, Ericsson, K., Krampe, R. and Tesch-Romer, C. (1993) *The Role of Deliberate Practice in the Acquisition of Expert Performance*. *Psychological Review*, 100:3, 363-406
- ⁶ Claxton, G., Lucas, B. & Webster, R. (2010) *Bodies of Knowledge: How the learning sciences could transform practical and vocational education*. London: Edge Foundation
- ⁷ Perkins, D. (2009) *Making Learning Whole: how seven principles of teaching can transform education*. San Francisco, CA: Jossey-Bass.
- ⁸ *Ibid*
- ⁹ Langer, E. (1998). *The Power of Mindful Learning*. New York: Da Capo Press.
- ¹⁰ Perkins, D., Tishman, S., Ritchhart, R, Donis, K. and Andrade, A. (2000). Intelligence in the Wild: A dispositional view of intellectual traits. *Educational Psychology Review* 12(3): 269-293.
- ¹¹ Perkins, D., and Salomon, G. (1988). Teaching for Transfer. *Educational Leadership* 46(1): 22-32.
- ¹² Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper and Row.
- ¹³ Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York: HarperCollins.
- ¹⁴ Lindström, L. (2006). Creativity: What is it? Can you assess it? Can it be taught? *International Journal of Art & Design Education* 25(1): 53-66.
- ¹⁵ Hetland, L., Winner, E., Veenema, S., and Sheridan, K. (2007). *Studio Thinking: The real benefits of visual arts education*. New York: Teachers College Press.
- ¹⁶ Pea, R. (1993). Practices of Distributed Intelligence and Designs for Education. In: Salomon, Gavriel (ed.) *Distributed Cognitions: Psychological and educational considerations*. Cambridge: Cambridge University Press.
- ¹⁷ For an overview of these, see Lucas, B. and Claxton, G. (2009). *Wider Skills for Learning: What are they, how can they be cultivated, how could they be measured and why are they important for innovation*. London: NESTA.
- ¹⁸ Dewey, J. (1916). *Democracy and Education*. New York: MacMillan.
- ¹⁹ Boud, D. (2001). Introduction: Making the move to peer learning. In: Boud, David; Cohen, Ruth and Sampson, Jane (eds.) *Peer Learning in Higher Education: Learning from and with others*. London: Kogan Page Ltd.
- ²⁰ Lave, J. and Wenger, E. (1991). *Situated Learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- ²¹ Choi, I., Land, S. and Turgeon, A. (2005). Scaffolding Peer-Questioning Strategies to Facilitate Metacognition During Online Small Group Discussion. *Instructional Science* 33: 483-511.
- ²² See for example, Bandura, A. (1977). *Social Learning Theory*. New York General Learning Press.
- ²³ Sharan, Y., and Sharan, S. (1992) *Expanding cooperative learning through group investigation*. New York: Teachers College Press.
- ²⁴ See <http://www.debonothinkingsystems.com/tools/6hats.htm>
- ²⁵ Frayn, M (xxxx) *Noises Off*
- ²⁶ Sternberg, R. (1986) *Intelligence applied*. New York: Harcourt Brace Jovanovich.
- ²⁷ Perkins, D. (1995). *Outsmarting IQ: The emerging science of learnable intelligence*. New York: The Free Press.
- ²⁸ Hattie, J. (2009) *Visible Learning: a synthesis of over 800 meta-analyses relating to achievement*. London: Routledge

²⁹ See, for example, Crouch, C., & Mazur, E. (2001). Peer Instruction: Ten years of experience and results. *American Journal of Physics*, 69(9), 970.

³⁰ <http://www.khanacademy.org/>

³¹ Savery, J. and Duffy, T. (1995). Problem Based Learning: An instructional model and its constructivist framework. *Educational Technology* 35: 31-38.

³² Kirschner, P., Sweller, J. and Clark, R. (2006). Why Minimal Guidance During Instruction Does Not Work: An analysis of the failure of constructivist, discovery, problem-based, experiential and inquiry-based teaching. *Educational Psychologist* 41(2): 75-86.

³³ Hetland, L., Winner, E., Veenema, S., and Sheridan, K. (2007). *Studio Thinking: The real benefits of visual arts education*. New York: Teachers College Press.

³⁴ Guy Claxton, Maryl Chambers, Graham Powell and Bill Lucas (2010), *The Learning Powered School: Pioneering 21st Century Education*, Bristol: TLO Ltd.

³⁵ <http://learningqualityframework.co.uk/>