Illustration: St Margaret's Church of England High School, Liverpool.

DRAWING TO LEARN LEARNING TO DRAW

Eileen Adams

Eileen Adams is a freelance consultant, working in the UK and other countries. Her career has involved teaching, lecturing, researching, writing, evaluating and examining.

In the 1970s, in teaching and curriculum development, Eileen worked with professionals from different backgrounds, gaining a fresh perspective on education. In the 1980s, on research and development projects, she extended her own understanding of the purposes and practice of art and design education. In the 1990s, as research fellow and examiner, she learned about evaluation and validation, which reinforced the importance of action research and the need to develop theory from practice. Since 2000, Eileen has continued to link curriculum development and professional development through her work with The Campaign for Drawing.

Eileen has always used drawing as a medium for learning, recognizing that not only is it possible to learn to draw, we can also draw to learn. Through drawing, we can learn to think, to communicate and to do things.

*This paper is one of seven PDFs in the **TEA** resources (drawing as thinking, expression and action), based on the work of teachers and students involved in a professional development programme, the aims of which were to give young people an enhanced experience of drawing, and to create a valuable legacy to support secondary teachers' practice in art and design education.*

__TEA__ was organized by The Campaign for Drawing in collaboration with the National Society for Education in Art and Design (NSEAD) and the National Association of Decorative and Fine Arts Societies (NADFAS).

This paper written by Eileen Adams discusses the use of drawing as a medium for learning, arguing that it is not only possible to learn to draw, you can draw to learn.

DRAWING TO LEARN: LEARNING TO DRAW

Eileen Adams

Drawing

Words and numbers codify information. They enable us to understand experience, to shape ideas, to communicate thoughts and feelings and to do things. Drawing uses visual codes and conventions for the same purposes. Like words and numbers, it makes thought visible, accessible and capable of manipulation. Drawing is an intellectual and physical activity that links sensing, feeling, thinking and doing. In essence, drawing makes you think!

We might understand drawing as *marks that have meaning.* Seen in isolation, marks that make up a drawing have no obvious meaning. Taken together, and by using of certain codes and conventions in making the marks and relating them to each other, we can create meaning. Dots, lines, curves, blots, shapes, splodges of colour, areas of shading and hatching can imply distance, direction, division, enclosure, edge, form, location, position, node, size, scale, space and time. They can represent people, structures and natural form. They can suggest physical or emotional qualities such as light, movement, weight, balance and rhythm or abstractions such as beauty, peace, struggle or violence. Drawing allows us to respond to spaces and places that have a physical presence, to visualise distant environments, and to imagine those that exist only in the mind's eye. Drawing makes it possible for us to understand the mathematics of space or appreciate the poetry of place.

Drawing is infinitely versatile. It can symbolise power and authority in a royal seal or it can be a shout of protest in scrawled graffiti. It can represent a person or a place, evoke a feeling or an atmosphere, create a memory or a dream, record observed reality or shape imagined fantasy. It can make the invisible visible, accessible and usable. It can be exploratory, investigatory, questioning. It can attempt to fix experience and create a trace, a memory or a memorial. It can formulate a vision of the future.

Drawing can be a quick sketch on the back of an envelope or a set of technical specifications carefully worked out on a computer. It can deal with analysis or synthesis. Drawing can show cause and effect. It can enable us to explore details of everyday experience, construct a narrative or contemplate issues of life or death.

> *Drawing is the primal means of symbolic communication, which predates and embraces writing and functions as a tool of conceptualization parallel with language* (Petherbridge 2010).

Drawing is so fundamental to our existence that we have incorporated it as a metaphor into our language. The first thing we do when we are born is to draw breath. Then we draw sustenance from our mother. To survive, we draw water and draw strength. Then when the years draw on, the evening of our life draws nigh and the final curtain is drawn down, we draw our last breath and all that is left is a drawn-out trace, a single continuous line on the printout from the heart monitor.

Drawing in design

So much of our material culture depends on drawing – the complex range of environments, products, communications and systems that support and shape contemporary life could not be brought into existence without it. Drawings are everywhere – on wallpaper, on the streets, on banknotes, road markings, tyre tracks at the scene of an accident – marks or traces that have meaning and purpose. However, it is the drawings we do not usually see that shape our world – plans that create the buildings we inhabit, diagrams for traffic systems, patterns for the clothes that we wear, or technical drawings that explain how to put into production the furniture and other artifacts that we use every day.

We do not see engineers' drawings of designs for sewers, super tankers or weapons of war, or storyboards that filmmakers or advertisers use, but our lives are significantly influenced and shaped by their drawings. It is remarkable that we can get water from a tap, drive safely on a motorway, know where to turn off at a particular junction, circumnavigate the globe or knit a patterned jumper. It is not always appreciated that we could not do any of these things without being able to make or to read drawings such as diagrams, maps, plans, charts, patterns and graphs. Drawing enables us to think, to make things and to makes things happen.

Contemporary drawing practice in art

Drawing features increasingly in exhibitions of contemporary art, more is being written about drawing in art, research on the topic is growing and a greater number of books are being published about it. Drawing can be both an element in the artistic process and a product of artistic practice. This is evident in recent work by David Hockney, who lauds the use of the iPad to speed up mark making and establish colour and atmosphere in response to landscape. He points out the exploratory and investigatory nature of drawing – *once you begin to draw you ask questions.* Grayson Perry tells us that drawing is … *a vehicle for outpourings of inner worlds;* Paul Noble describes his drawing as being about *access, route, passage and boundaries;* David Sheppard lists composers trained in art schools who create drawn scores, *finding ways of marrying fine art concepts to musical composition …* (Clarke 2011).

Artists tend to describe drawing in relation to their own purposes and artistic processes. This is reflected in the Drawing Research Network, dominated by artists' research on the nature of drawing through reflection on their own practice. Its conference theme for 2012, *Drawing Knowledge,* engaged with questions of what constitutes drawing and what constitutes knowledge, how knowledge authenticates drawing acts and how drawing might be constructive of knowledge.

The nature of drawing and the criteria for valuing it change with the times.

> *Since 1994, the Jerwood Drawing Prize project has aimed to affirm the value of drawing by providing an open forum to evaluate and disseminate current drawing and its practices, and to gain knowledge and understanding about the field through the artists currently making work within the discipline. Through the selection process panelists are encouraged to collectively establish criteria and to consider the nature and boundaries of drawing as a field. Continual refinement takes place as literally thousands of drawings are laid out for the selectors to see. Consequently, a dialogue arises between them about what is of value in drawing as a field, and in the drawings presented, as they debate what makes a drawing stand out for inclusion in their show.*
> (Jerwood Drawing Prize, 2012.)

Drawing in higher education

The world of design may be awash with drawings, artists may have rediscovered it as an art form and form of knowledge, but it seems that foundation course directors have noticed in the candidate selection process … *a decreasing amount of any kind of drawing in portfolios submitted, a limited range of subject matter and uses of drawing, and little speculative drawing for ideas development and research*. This has … *made confident selection of students more difficult, and that once accepted onto a foundation course, this lack of skills and confidence put students at a disadvantage in their learning* (Betts 2011).

There is evidence that course directors in higher education are reviewing the importance of drawing, and there are new initiatives to introduce multidisciplinary drawing courses. If you want to know what research is happening in drawing, scan the papers from recent conferences: *Locating Empathy with Double-Blind Drawing and Bimanual Palpation* (Angela Hodgson-Teall, University of the Arts, London); *Paul the Robot as Naïve Drawer* (Patrick Tresset and Frederic Fol Lemarie, Goldsmiths, University of London); *Learning to Pause – the role of the pause in observational drawing* (Angel Brew, Camberwell College of Art, University of London), (Kantrowitz et al 2011) were just a few of the research goodies on offer.

Drawing in schools

Numeracy and verbal literacy are key in developing our capacity to understand, to think and to participate in the concrete world of objects, events and experiences, as well as in the abstract world of ideas. Verbal literacy is not just about being able to read and write. It is about being able to participate in the world of ideas, the ideas that shape society, as well as those that create our physical and cultural environment. The same is true for visual and spatial literacy, which are also important in developing the intellectual survival kit to enable us to prosper in an increasingly complex world, to be inventive and creative. They are essential in a 21st century curriculum. Drawing is a key element. In UK schools, drawing is used in a range of curriculum areas, but is not given sufficient attention or used as effectively as it might. This is surprising, when students spend at least 10% of teacher-directed time drawing (Rinne 1999), and probably do a lot more in their own time.

Art, craft and design education

The art, craft and design curriculum contributes to young people being visually literate, so that they are able to read, interpret and construct meaning from the signs and symbols, codes and conventions used in works of art, craft and design, and are able to use these in their own work. The art, craft and design curriculum fosters aesthetic awareness, artistic and design sensibility, understanding and skills. It nurtures intellectual curiosity and contributes to intellectual development, practical knowledge and emotional intelligence. It links the inner world of memory and imagination with the outer world of lived experience and objects. Its significance is not about making images, artifacts and designs that accord with adult expectations and preconceptions, but about learning how the world and its objects can be shown, represented and shaped. Drawing has a crucial role to play. It can support the learning process, as well as result from the process of learning: both process and product are important.

The art, craft and design curriculum is about developing our capacity to learn, to think and to do things. It is dependent upon the use of mental models, using visual, spatial, kinaesthetic and haptic modes of study.

> *Cognitive science now recognizes that the mind engages with the world through the medium of mental models. These represent or stand for external reality as presented through the senses. They are neurological constructs which can be manipulated neurologically. Memory uses models of past experience …*
>
> *... Even more remarkably, the mind can also model things which do not exist. These can be fantasies but equally they can be plans for the future proposals for things, events or institutions which might one day be brought into existence*. (Baynes 2013.)

Drawing develops the capacity for different kinds of thought, cognitive and affective, convergent and divergent: e.g.

- analytical
- reflective
- interpretative
- logical, deductive
- imaginative, inventive,
- speculative, hypothetical

Drawing develops not only perceptual and analytical skills, but also fosters the ability to visualize, nurturing powers of imagination, invention, innovation and creativity, using techniques such as adaptation, appropriation and transformation. Both manual drawing and the use of digital technologies can underpin work in painting, illustration, printmaking and sculpture, as well as in many areas of design, such as graphic design, fashion design, textile design, jewellery design, architecture and environmental design.

The curriculum is heuristic, with pupils making discoveries and solving problems themselves, gaining confidence and developing capacities for investigation and experiment, handling ideas through manipulating materials, media, tools and technologies. Drawing plays a significant part, both as an end in itself, and as a means to an end.

OFSTED

Drawing is now a recognized element in the inspection process in primary schools in the UK. Ofsted inspectors look for evidence of drawing from memory, observation and imagination. The challenge for the teacher is to know how to support learning through drawing.

A recent OFSTED Report on art and design education in primary and secondary schools and further education colleges found that teachers' subject expertise in drawing varied widely, primarily because of lack of confidence in their own drawing abilities, which made them reluctant to demonstrate drawing techniques. This is probably related to the absence of professional training in learning through drawing. Perhaps if teachers thought of drawing as a learning strategy and not a performance skill, this would less of a problem.

Inspectors recommended that … *schools should increase pupils' confidence and creativity in drawing by widening the repertoire of teaching approaches, including teaching adventurous drawing for all*. Their view was that the best work in schools and colleges was characterized by a breadth of drawing media used for a wide range of purposes, including recording, experimenting, analyzing and developing ideas.

Inspectors observed that where achievement in drawing was at its best, teachers and subject leaders:

- *ensured pupils were exposed to a range of approaches to drawing across all key stages and supported progression in pupils' mark-making as drawing*
- *helped older primary pupils sustain their enjoyment and confidence in drawing as a key process*
- *tackled students' low confidence in drawing in the early stages of secondary school*
- *offered exciting reasons to draw which modeled those used by creative practitioners*
- *attached importance to drawing in the development of the subject and in their evaluation of the quality of the provision offered to pupils and students*
- *refreshed their own engagement with drawing through professional development, including work with creative practitioners and art galleries* (Ofsted 2012).

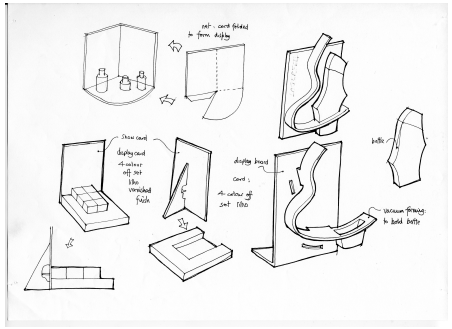
Inspectors found that pupils of all ages cited drawing as one of the most important skills in art and design, and perceptions of their own drawing abilities were often at the heart of their attitude to the subject.

Drawing to learn

Just as different kinds of speaking and writing serve different purposes, drawings need to be understood not just as an end in themselves, but as perceptual, conceptual and expressive tools, an aid to understanding, thinking about and communicating ideas. Drawings can be used to externalize and manipulate ideas to clarify, order, develop and refine thinking. Drawing is not a set of discrete skills and techniques; it is a means of developing a capacity for different kinds of thinking, particularly thinking in progress, as well as conclusive thought.

Drawing is often considered to be a 'talent' or skill that you have or do not have. It is more accurate to think of it as an innate capacity that can be nurtured and developed through experience, learning and practice. We learn to walk, and some of us become runners or dancers. We learn to talk, and some of us become chatterboxes or linguists. In much the same way as we learn a verbal language through experiment, trial and error, we learn to draw. However, to develop both verbal and visual literacy, sensitive tuition ensures a greater understanding of how to use our knowledge and skills. The challenge for the teacher is to help students address key questions about purpose (why draw), content (what to draw) and technique (how to draw).



Illustrations: ***Perception:*** *Castle Toward Summer School,* ***Communication:*** *Dunfermline High School,* ***Invention:*** *Kesteven and Grantham Girls School,* ***Action*** *Watford Grammar School.*

Purpose

> *The most powerful educational experience is to have the excitement and satisfaction of applying both skill and knowledge to achieve a worthwhile goal. It is in the purposeful application of both skill and knowledge that the true relevance of education is made clear* (Baynes 2010).

To understand drawing in the context of learning, it is more helpful to ask what is the drawing *for*, rather than what is the drawing *of*? It may be for the benefit of the drawer, or it may be to facilitate interaction or collaboration with others, or for communication designed specifically for a viewer – usually, the teacher or examiner.

As a learning strategy, drawing can be used across the curriculum, but it has particular significance in art, craft and design education, where drawings are done for a variety of purposes as part of the learning process, developing capacities for *perception, communication, invention* and *action. (*See ***Power Drawing*** series of books published by The Campaign for Drawing for examples of different kinds of drawing for different purposes).

Drawing as *perception* is that which assists the ordering of sensations, feelings, ideas and thoughts. The drawing is done primarily for the need, pleasure, interest or benefit of the person doing the drawing. It might enable them to explore and to develop observation and interpretative skills to investigate and understand the world. Other people might not understand these drawings, but that does not matter, they are primarily for the benefit of the drawer to understand something.

Drawing as *communication* is that which assists the process of making ideas, thoughts and feelings available to others. Here, the intention is to communicate sensations, feelings or ideas to someone else. It is likely that certain codes or conventions will be used so that the viewer will be helped to understand what is being communicated. It might be for an unknown audience. It might be to support group interaction, discussion or other learning activity. The key thing is that the viewer needs to understand the codes or conventions that are being used.

Drawing as invention is that which assists the creative manipulation and development of thought. This is where you cannot think the thought until it is made visible and accessible, capable of change and manipulation. Ideas are at an embryonic stage, unformed or only partly formed at the beginning of the process of drawing. Ideas take shape when the drawer experiences 'reflexive oscillation' between impulse, ideas and mark, receiving feedback from the marks appearing on the page, which prompt further thought and mark-making. Usually the drawing is one of a series, where ideas are explored, repeated, refined, practised, worked over, discarded, combined, where alternatives are sought and alternative possibilities explored. Key activities here are translation, formation, transformation, adaptation and invention.

Drawing as *action* is that which helps to put ideas into action. These drawings form a bridge between the realm of the imagination and implementation. The intention is not just to focus on the content of ideas and proposals, but also to put them to the test and see how to put them into effect – plans, patterns and templates, for example.

Of course, some drawings relate to more than one category. The emphasis is on drawing to learn rather than on learning to draw. The main concern is the process of drawing within a learning activity, rather than the drawing as a product of the learning

process. There may also be a range of outcomes to which drawing can contribute in relation to intellectual, emotional and social development.

Perception

The purpose of observational drawing and analytical drawing is to enable the student to understand what they are experiencing, to perceive relationships not evident from a casual glance or from a photograph. The constant viewing and reviewing, identifying elements, measuring, establishing relationships and making connections, involves a number of approximations, modifications and refinements. The drawing is not an illustration: it is a record of the student's struggle to understand.

Certain kinds of drawing encourage students to document experience, to reflect on it and to rework it to help them gain understanding or insight.

> Drawing *can be considered a form of mediation. Mediation involves looking at the world without judgement and allowing what is in front of us to become understandable ... I'm fascinated by the fact that current neurobiology study suggests that there may not be any reality out there until the brain creates it. What is most compelling to me about the act of drawing is that you become aware or conscious of what you're looking at only through the mechanism of trying to draw it. When I look at something, I do not see it unless I make an internal decision to draw it. Drawing it in a state of humility provides a way for truth to emerge.* (Glaser 2008.)

Expression

Perception and expression can be considered as two sides of the same coin: *What do I want to say? How can I say it?* Drawing does not have to be in response to objects or events, but might relate to feelings, memories and dreams. In fine art, when the brief is self-determined, the motivation is often prompted by the drawer's experience, concerns or fantasies, drawing enables students to explore ideas and issues that have personal significance or are important to them.

Drawings might be primarily exercises in formal language. Illustration might be in response to an external brief, where the prime function of drawing is interpretation, often using symbolism and metaphor to convey meaning, clarifying, bringing alive or intensifying a particular text.

Many teachers emphasize the need for students to be able to express themselves. However, this is generally in response to a theme that teachers have identified, and ways of working that the teacher determines. Where do art and design teachers derive their ideas for projects? Are these based on their own interests and strengths? Are projects chosen because teachers think they will appeal to students? Are projects selected because the teacher knows from experience that they will be successful? Are students clear about the learning objectives? Surely self-expression means that students need to determine the content, the means of developing ideas and the final form of their work? What is the role of the teacher in helping students develop their own voice?

So often, students are worried about making mistakes, 'doing it wrong.' However, sometimes an unintentional mark can transform a drawing, giving it a new impetus, direction or meaning. Experiments result in happy accidents, where marks are created outside the drawer's control, but can be incorporated in the drawing to explore and express sensations, feelings or ideas. Quentin Blake explains how this works in practice and offers some encouragement:

> *I drew them in soft pencil first, and then inked in the outline, being careful not to let fall a blot of ink that might ruin the drawing. Then when the ink was thoroughly dry, I rubbed out the pencil lines. Eventually, however, two things helped me to change my method of drawing and find the way I use now. One was that after a while I began to submit to Punch not finished drawings, but roughs: and now and then it became apparent that there were things in these roughs – moments of fluency, atmosphere, expression – that I wasn't capturing in the finished drawing ...*
>
> *The other discovery was that there wasn't, after all, such a need to be anxious about mistakes ... and if I made a blot I could get some process white and paint it out. And not only that: I discovered that if necessary you could do an extra bit of drawing and stick it on and when it was printed it didn't show. For a while my drawings developed into a sort of collage of cutout pieces of paper while I tried to get the very best results ...*
>
> *But this wasn't the main advantage, which was that I could now feel relaxed about producing a drawing and, curiously enough, if you are more relaxed you can concentrate better, you are able to focus your mind on exactly what is happening in front of you, the scene you are imagining in your mind and living through the pen you are holding in your hand. I began to enjoy the scratchiness and fluency of the nib as it instinctively searched out what I was trying to draw ... it was on account of this relaxation – or increased concentration that I really began to learn about drawing and what I could do with it.* (Blake, 2000.)

Invention

Drawing can be a means to an end, as well as an end in itself. It is helpful to think of

drawing as both a noun and a verb (or more accurately, a gerund – a noun acting as a verb), implying both process and product. Drawing can contribute significantly to the process of thinking and developing ideas: a warm-up or stimulus, as a means of investigation, to aid experimentation, to test out ideas, to consider alternative possibilities, a means of invention for a painting, a sculpture or a design. It is helpful to think of drawing here as thinking in progress, ideational drawing:

> *... a 'denkraum' - a space where the individual thinks. It can be ...drawing processes, where one thinks with and through drawing to make discoveries, find new possibilities that give course to ideas and help fashion their eventual form... Ideational drawing (as process and as artefact) is a thinking space – not a space in which thought is re-presented but rather a space where thinking is presenced. In its effectiveness, its period of efficacy, ideational drawing is 'thinking' not ' thought'* (Rosenberg p.109, in Garner, 2008.)

Nurturing design awareness means developing good observational skills and the facility for being able to do quick sketches. Generating ideas requires ideation, the ability to create conceptual sketches, to make thought visible and capable of manipulation. Visualising alternative possibilities enables students to hypothesise and speculate. Sharing ideas with others through drawing extends opportunities for testing and critique. It is likely that a series or sequence of drawings will support the development process. Drawing can promote imaginative thinking, involving translation, appropriation, adaptation or transformation. The outcome might not take the form of a drawing.

Action

Drawing for design can be the conceptual sketch or it can be a detailed specification. It is only at this late stage that technical drawing needs to kick in, when the student has to understand how to construct the environment or how to manufacture the product, and perhaps convey that information to someone else – here, accurate measurement and clarity of presentation are important.

Influences

Where do students get their ideas for drawing? What is the subject matter or content? Is the work derived from students' lived experience, aspirations, imaginings and inventions, or from the teacher's vision? Teachers are a prime influence on students' work. They are a source of great inspiration for students, suggesting projects, indicating references, encouraging experimentation, demonstrating techniques, advising on ways of developing work, offering feedback and helping students review their work. Teachers have a key responsibility to expose students to experiences and ideas that they would not otherwise encounter to extend their knowledge and understanding of the world. John Hattie identifies five major dimensions of expert teachers who:

- *can identify essential representations of their subject,*
- *can guide learning through classroom interactions,*
- *can monitor learning and provide feedback,*
- *can attend to affective attributes, and*
- *can influence student outcomes.*

Hattie J. (2003)

What ownership do students have of the ideas? Do subject matter and learning activities relate to their needs? Do they take account of cultural context, age and gender? Do they involve individual and group work? Do they require independent study? There is much pressure on teachers to ensure successful results. However, there is the danger that if the teacher does all the creative thinking, and the project is more or less worked out before students even start, students may have fewer opportunities to develop their own ideas, interpretations or solutions.

Who is being creative? Is it the teacher who conceives of and structures the project? Is it the students, given a chance to develop and exercise their powers of creative thinking and expression? Is there a danger of the teacher using students as a creative medium? How far should teachers determine projects? How much direction should they give to structure students' thinking and activities? What kinds of support should they offer?

There is sometimes a lack of spontaneity in students' work, perhaps as a result of teachers doing too much of the thinking for them, and inadvertently removing elements of fun, play, challenge, experiment and risk from the experience of art, craft and design. Students should experience learning that involves challenge, risk-taking and unpredictable outcomes – drawing can be a useful vehicle here. It allows students to experience satisfaction and success: it can also help them learn to deal with frustration and failure. It can be a way of dealing with fears, channeling fantasy, and a useful therapy when they are fed-up!

Drawing might be inspired by students' personal experience: drawing fixes experience in the memory, and can then act as an aide memoire, triggering thoughts and feelings that might otherwise be lost. Drawing can enhance emotional response, encouraging an awareness of atmosphere or mood.

Drawing can be inspired by experience of the environment, both natural and man-made. It can intensify experience by obliging students to focus and concentrate, observe and recording. Drawing offers a way of connecting, a means of engagement, an opportunity to stop and stare, and creates time to build a relationship with

something. Then perhaps the student moves on to quiet reflection, to internalise what has been experienced, and to rework it in order to understand it.

> *By drawing the world around us we learn to see it. By using our imaginations we learn to feel truly alive. Combine these things and the possibilities are endless ... For me personally, drawing is the immediate expression of seeing, thinking and feeling. It is a tool for investigating ideas and recording knowledge, and a reflector of experience. Drawing is a mirror through which I understand my place in the world, and through which I can see how I think. I will always draw, not only to make art, but because it is how I engage with and anchor myself in life. It makes me feel excited to be alive* (Simblet 2005.)

Most importantly, drawing enables the student to establish correspondences and resonances, to create meaning.

Students' drawings can inspire other students. The school website offers wonderful opportunities for virtual galleries to feature drawings from various year groups, as well as portfolios of individual students. Very importantly, the school website can be a valuable means of promoting drawing across the curriculum: the use of drawing as a medium for learning can be explained, illustrated and supported through online tutorials, a valuable resource not only for students, but for teachers and parents too. Making students' drawings available for public scrutiny can raise standards by encouraging students to value their own work and appreciate that of others.

Drawing might be inspired by the work of artists, illustrators and designers, where students make use of rich imagery from books and the Internet, or from seeing drawings in exhibitions, so that students are stimulated to develop their own powers of imagination and invention. Their knowledge of contemporary drawing practice is based on their experience of graphic artists in comics, animated films and computer games. Students are routinely introduced to the work of artists, discover work by illustrators, graphic artists and animators, themselves, but do not necessarily see drawings by designers – architects, landscape architects, engineers, clothes designers, set designers or exhibition designers – or those by other professionals such as scientists and archaeologists. They do not generally see professionals' drawings in sketchbooks, technical drawings, different kinds of maps and plans, mathematical drawings, botanical illustrations, geometric figures, CAD design sequences or drawings from other cultures.

Students need to be exposed to a wide range of drawings, not only those by fine artists or graphic artists, but also by others who use drawing in their professional practice, to reinforce the idea that different kinds of drawings serve different purposes, and make use of different codes and conventions. It is important that students see examples not only of highly refined drawings, but also those that show thinking in progress – rough sketches, annotated sketches, drafts and revisions. Students can create their own digital archives of drawings by and designers of all kinds to include examples of different kinds of drawings – annotated sketches, designs, perspectives, maps, plans, sections, diagrams, overlays.

Skills, techniques, materials, media, tools, technologies

Much drawing in schools focuses on skills and techniques. What opportunities are there for students to experiment with tools and materials to develop a vocabulary of mark-making and to handle expressive media with confidence and skill? How far should teachers provide instruction in drawing techniques, and how important is it that students discover these for themselves?

Learning to draw takes time and requires practice. Pressures on the curriculum and the timetable mean that students are losing out on valuable opportunities for learning to draw as well as drawing to learn. They should have sufficient time to practise handling materials, media, tools and technologies to develop confidence and competence in their use, and to refine their skills in employing a range of drawing techniques.

Copying has been a technique through which apprentices have learned their trade for hundreds of years. However, when does copying the work of others become a form of pastiche? Students may rely too heavily on appearance, and not understand how the artist thinks or works. They may neglect to bring into play interpretation skills or allow their own voice to be heard. What is the value of studying artists' work?

Many teachers mention the pride and sense of achievement students have when they master skills in the use of particular media or drawing techniques. Pencil continues to be a favourite medium. However, it can be very difficult to master, and students might gain confidence more readily by using biro or pen and ink, where the marks cannot be erased, but have to be worked on, over or changed, or a series of drawings made to enable students to work on a particular problem.

Many teachers mention the value of quick drawing exercises to develop confidence in the use of various techniques and skill in the handing of different media: e.g. continuous line drawing, charcoal, chalk on black paper, transforming ink blots, drawing with the other hand or different body parts, sequences of quick drawings and blind drawing. However, unless students have opportunities to practise drawing using these media, and make their own choices and decisions about which technique and which medium is suitable for a particular purpose, they will not develop their skill.

Both manual and digital drawing enable students to generate, appropriate and manipulate images to develop thinking. Drawing by hand creates time for the student to think, to solve problems, to revise and rework mistakes, and to make use of random or accidental marks, a process of reflexive oscillation, where marks inform thinking, and thought influences the marks in a continuous iterative process. (Witkin 1974.)

Drawing which makes use of digital technologies is a useful tool when students are working from images, using their own photographs, or those of others, most likely downloaded from the Internet, editing and manipulating them to shape and communicate ideas. Computer technology enables students to test out different configurations very quickly, and opens up opportunities for time-based work, evident in animation, film and computer-aided environmental design. Projects that use computer technology create new possibilities for combining manual drawing, computer-generated and computer-aided drawing. It does not have to be one thing or another – students can draw on printouts, then scan manual drawings into the computer to work on them, perhaps doing this repeatedly. iPads are increasingly popular as a drawing tool. Taking drawing into animation, either with shadow puppets or through computer-based work, adds elements of motion and time-based work to extend students' repertoire of drawing strategies.

Context

Drawing is essential not only for work in the studio but can also support learning in other contexts. This may be using drawing as a form of analysis when learning about the history and cultural diversity of art, craft and design, or using drawing as a tool on field trips. It obliges students not only to look, but also to think about what they are looking at. Drawing is a useful strategy for recording information, as the time taken to do the drawing increases the amount of attention paid to the subject and prompts students to question what they are observing.

Research notebooks, sketchbooks, visual diaries, travel journals – all kinds of drawing notebooks – have an important part to play in shaping habits that underpin our ability to draw and to learn through drawing. They nurture skills of observation, recording, reflection, analysis, interpretation, experimentation, planning and synthesis. They create a mindset where students are more receptive to experience and ideas, and provide opportunities for students not only to reflect upon and rework their experience, but also to experiment and imagine, to generate and develop new ideas.

Students need to use drawing notebooks to hold a trace of experience, to collect, record and store ideas, compiling material that they can use as a source of inspiration and reference for future work. Skills in observational drawing and speed drawing are useful here. Research notebooks are particularly valuable on field trips, when there is opportunity for sustained use, enabling students to hold a trace of their experience, and encouraging habits of paying attention, questioning and reflecting.

The sketchbook is important as an experimental space. Although many sketches will be quick and hastily executed, incomplete and imperfect, this does not mean that they lack care or consideration. Sometimes, it is more appropriate to work quickly, with bursts of energy and intensity of engagement, rather than to adopt a slow and more laboured approach. The process of drafting, sorting out, trying out and reworking ideas is accepted in the production of written work. It is also essential in art, craft and design. Sketchbooks are important to show the genesis and evolution of students' work. They are an indicator of students' interests and creativity, their capacity to experiment and their persistence in researching and developing ideas.

The use of sketchbooks has become increasingly popular with examination boards, teachers and students. However, are students clear about the wide range of purposes that sketchbooks might serve? Are they using them as research notebooks to investigate and experiment, or merely as scrapbooks, a collection of inspirational images and quick experiments that do not add up to anything much? In some, the activity of doodling takes over, so that sketchbooks are more like therapeutic journals. In others, the urge to decorate and embellish the pages dominates, and each page becomes a mini-artwork, changing the document into an artist's book.

Because students are so aware of the importance of assessment, they are tempted to treat drawings as illustrations, to impress the viewer or to prove something to the teacher or examiner, rather than enable the student to understand something, to feel something, to think something, to decide something, to express something, to make or to do something. There is the danger that sketchbooks might lose their purpose as research and development notebooks, and become instead a set of illustrations or a collection of information graphics. In some schools, there is a worrying trend, where sketchbooks are replacing other forms of art activity.

Learning to draw takes time. It requires practice. Some teachers establish sketch clubs to encourage students to draw, to extend the time they spend drawing and provide opportunities for them to share ideas, to critique each other's work and build up portfolios. Clubs offer motivation for everyone and provide extra support for those students with a particular interest in the subject. Mixing age groups and skill levels, and seeing drawing by other students is stimulating.

Drawing at home can be a very different experience from drawing in school, especially if the student understands that drawings will not be scrutinised, judged and assessed. Homework can be used for drawing to reinforce what has been learned in class, to create opportunities for reflection and reworking ideas so that students understand them more fully. Young people need time to experiment, to practise, to make mistakes and to develop skills in handling media and using techniques. Most importantly, they need time to think! Drawing creates time and space for thinking. The drawing might not represent the thought, but it might prompt it or help to create it. This may be through reflective thinking, where the student reworks experience to understand it; or ideational thinking, requiring the student to generate and visualise new possibilities; or inventive thinking where the student tries to shape and develop ideas.

Drawing is a very flexible tool on visits to museums and galleries. Sometimes photography is not allowed in these settings, so using a notebook and pencil is the best way to record experience, information or ideas. Speed drawing is invaluable here. It enables students to make rapid notes to record quick impressions, key elements or the essence of an idea. These drawings hold the inspiration, the prompts or the trace of memory on which students can build.

The habit of drawing can develop skills of independent study and sustain a learner for life. The habit of note-taking, the questioning, reflective stance, the search for order and meaning, the desire to understand experience and phenomena and to work out relationships through drawing can support learning in a variety of contexts. Those who develop the ability to use drawing as a means of ordering experience and ideas always have a useful intellectual and practical tool to hand.

Although many young people are concerned with developing a personal style of drawing, they should be encouraged to understand that different kinds of drawing serve different purposes, so that in some cases, it is more important that they adopt a public language, which makes use of established codes and conventions, rather than continually try to develop and refine a personal style.

Drawing is generally seen as an activity for the individual, but it can be a valuable aid to group work. By making ideas visible and accessible, drawings are capable of being manipulated and modified by a number of people. Here drawings are altered, extended, worked over, added to or rejected and replaced to develop thinking by a group. It facilitates social interaction and improves spoken communication, enhancing skills of negotiation and persuasion. The challenge is to move from regarding the practice of drawing as personal, solitary and individual, concerned with personal expression, personal development and personal taste, to viewing it also as a public activity, encompassing dialogue, shared judgement and action.

Drawing across the curriculum

Drawing is not just as a practical skill, but is an intellectual activity with a much broader compass that can be used to foster learning in a range of disciplines, not only art or design. Drawing is a learning strategy that can be used in any subject area.

> *… drawing (both as act and artefact) does not solely relate to the art world, but belongs equally to engineering, architecture and design, to science, philosophy, to literature, to music, to every possible area of creative and communicative endeavour that involves making and thinking, and to every person who picks up a pencil (or indeed a computer mouse) to sketch out an idea. It is a universally ubiquitous means for generating and critiquing ideas and forms for investigating the world. It is entirely democratic: belonging to everyone, blurring distinctions between art and everyday usage, between art forms, between conceptual and perceptual, bringing high art and popular imagery into new conjunctions and bridging art and science.*
> (Petherbridge 2010.)

Just as English teachers have a responsibility to nurture verbal literacy across the curriculum, so too art and design teachers have a responsibility to nurture visual literacy. Each discipline imposes its own set of codes and conventions: each subject in the secondary school curriculum makes use of particular forms and systems of drawing. An observational drawing of a plant in biology can look very different from a drawing of a plant done in art / design, though the main purpose in both instances will be to oblige the student to observe and to analyse. In science, the student will be expected to conform to a set of established conventions about how to document their analysis: in art and design, different set of conventions operate, and the student may also be expected to bring to the activity a degree of interpretation and personal insight.

Every subject can make use of drawing to develop thinking skills. Mind maps, flow charts, tree diagrams, critical path analysis and storyboards, for instance, are not subject specific, but can help students sort out information in any curriculum area, clarify their thinking or plan their work. In mathematics, drawing enables us to represent complex information simply and to visualise relationships between disparate strands of data: graphs and charts are familiar ways of ordering, organising, analysing and synthesising numerical data so that it is more easily understood.

Drawing enables students to visualise the past, and may also help them empathise, entering imaginatively into the lives of others. Drawing has been a key tool in music notation, a form of drawing where the conventions are universally recognized. Choreographers make use of scores using different notation systems to plot movement and dance sequences. Strategy sessions in sports are helped by creating diagrams of possible games plans, and testing these out against probably moves by the opposing team.

Drawing is not just for some so-called visual learners. We are all visual learners – drawing is for everyone. Students trying to remember, organise information, visualise ideas or plan a course of action can use drawing to help them think. It does not require special technology or resources, only a notebook and pencil, or a computer and a mouse.

Drawings can be objective, conveying information and ideas. Drawings can be subjective, communicating an emotional response. They can help students link the internal world of memories, thoughts, dreams and desires with the exterior world experienced through the senses and the intellect. Drawings can be used to describe and explain what exists: they can also explore what might be.

What if there was no drawing in schools? Imagine a week of lessons where the use of drawing (i.e. marks that have meaning) by students, teachers and administrators was banned for learning, teaching and management. Only words and numbers would be permitted. Maps, plans and diagrams of all kinds would not be allowed, so that would rule out much of the work in geography, maths, economics and science. In history, how would students be expected to visualise what life was like before the invention of photography? In English and modern languages, only the use of oral language would be permitted, as written or printed language would be incomprehensible without the use of punctuation – so that would rue out the use of textbooks. Art and design students would have to focus on photography and 3D work. In design and technology, students could not plan: they would have to create their designs through experimenting with materials and forms, and would not be able to measure accurately. Sports and games would be impossible without the use of courts and pitches marked out. Any maps, charts or posters with drawn illustrations or diagrams would have to be removed and the use of websites with graphics or the written word banned, so that would limit the use of computers. No handwriting (a highly conventionalized form of drawing) would be permitted. The timetable would collapse, as the use of the grid would be forbidden. Attendance registers would be useless. To cap it all, the school would probably be closed for health and safety reasons, as there would be no plans allowed to show the layout in case of fire!

Effective learner

Secondary school students should have opportunities to use drawing purposefully to enable them to learn effectively in different ways in a range of contexts. Drawing is a useful way to focus attention and sustain concentration. Drawing can prompt and extend learning. Many teachers encourage students to use drawing to reinforce learning. They believe that the act of summarising ideas or information in a mind-map or diagram makes it more likely that students will remember. They encourage them to use drawing as note-taking, to organise their thoughts, to conceptualise ideas, and to work things out. They understand that drawing is a means of assimilating information and relating ideas to one another.

Before embarking on a new area of study, teachers may invite students to explain what they know already through creating a web of linked ideas, or a diagram showing how something works, or a symbolic representation to identify key meanings. At the end of a project, new drawings are compared with the initial ones to consider what has changed in students' knowledge or understanding. Just as we repeat things to ourselves or make use of mnemonics to remember information, we can use drawing to help fix in our minds what has been learned. Mind maps can be used in all subjects to help students organise their thoughts, essentially they are about information management. It is not only the content that is important, but also the relationships between information and ideas. Mapping helps stimulate memory and enables students to retain more easily what they have learned. Drawing here is a useful tool for students to construct meaning.

Art, craft and design teachers have a responsibility to all the students to develop visual literacy generally in the school. How might they engage with teachers in other departments? How might they support them to develop more effective strategies for learning through drawing? How might they collaborate with colleagues to establish more effective strategies for using drawing within the art, craft and design curriculum? What do students learn though drawing in art, craft and design that can transfer to other areas of the curriculum?

Drawing can enhance certain dimensions of learning, encouraging resilience, resourcefulness, reflectiveness and reciprocity.

- *Resilience covers the emotional and attentional aspects of learning, and includes perseverance, absorption (or flow), concentration (or managing distraction) and perceptiveness (or attentive noticing).*

- *Resourcefulness focuses on the cognitive aspects of learning, including questioning, connecting (making links), imagining, reasoning, and capitalising (making smart use of resources).*

- *Reciprocity covers the social dimension of learning, and includes interdependence (balancing social and solitary learning), collaboration, listening and empathy, and imitation (receptivity to others' learning strengths).*

- *Reflection covers the aspects of learning that are to do with strategic management and self-awareness. They include planning, self-evaluating (revising), looking for further application (distilling) and fluency in the languages of learning.*

(Claxton G. 2010.)

Feedback and assessment

Drawings can provide a focus for dialogue between teacher and student, offering evidence of a struggle to understand, to shape ideas or to communicate. Often, drawing is used as confirmation of learning, when the main reason for asking students to draw is to prove to the teacher that they have learned something – preferably whatever the teacher has tried to teach them! It is important for teachers to acknowledge students' efforts and affirm the importance of practice and persistence. There is the need to point up students' strengths, as well as identify gaps in their knowledge or skills, provide advice on how to address these, and how to develop their drawing. How is feedback provided? On a one-to-one basis in conversations with individuals? In critiques, where

students learn ways of evaluating their own and each other's work, where they are encouraged to make value judgements about the quality of their work? Through written comments in sketchbooks or as an element in the marking process?

What place does testing have in helping students make better use of drawing? Is the assessment formative, predictive or summative? Some teachers have attempted to use the same drawing activity, such as an observational drawing, each year to test particular skills. However, these tests are not reliable, and in any case, tend only to address a very narrow band of technical skills. What about the intellectual, social and other practical skills that are learned through drawing? Are these included in criteria for assessment?

How to judge drawing? What are the criteria for assessment? Do students know what these are? Do assessments of students' work take account of the learning process as well as the products? Do they take account of both the content of ideas and the manner in which they are expressed? Should assessment acknowledge both effort and achievement? What types of drawing can students identify – can they name them? Which drawings can they do? What is their level of technical skill?

Does their drawing reveal flair and panache? Does it demonstrate care, precision and control? Qualities to be found in students' drawings depend on context and purpose. Drawings may show: accuracy, ambiguity, boldness, care, confidence, delicacy, effort, emotion, experimentation, fluency, honesty, imagination intensity, inventiveness, originality, risk-taking, sensitivity, strength of expression, a struggle to understand, visual impact. How are these qualities evidenced?

Assessment criteria in schools influence the nature of the learning process and determine outcomes. Many teachers fear that the emphasis on assessment is narrowing students' educational experience and limiting opportunities for learning. What are the criteria for assessment that might be appropriate? Should they relate only to technical and communication skills and the use of expressive media? Should they also be concerned with content and the ideas expressed? Some students choose easy and banal subject matter, but may execute it with skill and flair. Other students choose to deal with complex ideas, but perhaps do not have the technical skills to express themselves well. Which student merits a higher grade?

What strategies do teachers use to review students' work? Do they differentiate learning outcomes? What evidence is there that students build on previous knowledge and skills? What do students understand, think or believe now that was not possible before? What knowledge do students gain – what do they know now that they did not know before?

What skills do students develop – what can they do now that they could not do before? What evidence is there of increasing persistence in research and investigation, confidence in experimentation, ability in developing and refining ideas or competence in communication? In what ways have students engaged with new intellectual challenges? In what ways have they demonstrated ability to deal with more sophisticated levels of understanding? In what ways does students' work show increasing complexity and depth of study? In what ways do they demonstrate a growing understanding of context? In what ways do they display a greater capacity to learn and an increased love of learning?

Simon Poppy at Oakham School describes his changing view of the value of drawing:

> *I had not previously given sufficient value to the importance that drawing has to a child's perceptual understanding of the world. I must confess that I have fallen into the art teacher's trap of seeing it as a developmental skill and visual language to be taught to children so as to facilitate communication and to help them to appreciate visual phenomena, such as the fall of light on varied textures or the relationships of space and form, which of course it is. What the illustrations and text in the* (Power Drawing) *books have reminded me, is that in fact the primary, and often sole real value of a drawing, is to the person making the sketch – that it is what they are thinking and what they discover whilst they draw that is most important.*
>
> *Consequently, I try to be less swift to judge only on what I see, but rather on the context within which the drawing was made. As a teacher, one is eternally assessing outcome and this can be at the expense of giving sufficient value to (what is) learned (through) experience. Of course when one remembers one's own drawings that were significant, they were those that were highly charged with personal feeling and endeavour when they were made, this is not necessarily evident to the outsider, but marks them as important to personal development. The cumulative effect of the books is to reinforce the process and act of mark making as a key to coming to terms with problems, measuring them, assessing them and sensing them through drawing, whether in science, design or creative art.*

Attitudes

When they arrive at secondary school, many students are very enthusiastic about drawing. They find it a useful learning strategy and do it at home for pleasure and satisfaction. They see it as fun and enjoy it. They feel that drawing makes lessons more interesting and helps them understand ideas more clearly. They find it helpful for many aspects of their work in art and design, gain great satisfaction from developing technical and visual communication skills, and appreciate the experience of learning new strategies and having time to make use of them.

Some students see it as a contrast to other work that relies so much on verbal literacy

and numeracy. They view drawing as a practical and hands-on activity where they are in control. They also find it relaxing, peaceful and calming, something they can do for no other reason than to please themselves. They value drawing at home as a private and personal activity, not subject to other people's comment and judgement, and as relief from school, where their efforts are under continual scrutiny and assessment. Students involved in the TEA programme commented:

> *When we are drawing in art, we do it because we want to make a design of a thing and we do it because it helps us to use different skills, such as; colour schemes, shading, tone and sketching. It helps us to develop skills, which we might want to further use.*
>
> *We draw to show different expressions and to show an interpretation of an object or surrounding.*
>
> *We draw so we can show our ideas and imagination. Also, so we can analyse things using drawings, also so we can explain things and understand things, and you can use it for all different types of subjects.*
>
> *The purpose of drawing is to let your mind relax and let your creative juice flow out. Art teaches you how to create a piece of work through creativity.*
>
> *The purpose of drawing is … to create a lasting impression, emotion or feeling without using words or instructions.*
>
> *I see things differently now!*

Drawing not only helps students organise thoughts and cope with emotions, it also promotes positive attitudes to study. It can encourage intellectual curiosity, where students are open to new ideas and experiences, willing to explore and experiment. Making drawings inevitably involves frustration and failure. How do students deal with these experiences? The joy of drawing is that mistakes can be rectified and drawings improved, students can rework those things that go wrong and can learn how to deal positively if something falls short of what is required or expected. Drawing encourages habits of persistence, where ideas are developed, followed through, revisited, repeated and practised. Drawing enables students to engage in lateral thinking and hypothetical thinking, where previously unconnected ideas can be related in new ways.

However, many students have a rather narrow view of drawing, and are not aware of the different purposes it might serve. They see it primarily as a natural ability or a skill that you possess or lack – you are good at drawing or you are not! They do not understand that you can both learn to draw, and draw to learn. With their schooling increasingly dominated by words and numbers, students may lose the interest and motivation to pursue drawing activities.

When they leave school, all the facts and figures they memorise and the advice they receive are likely to be forgotten. What remains are the attitudes, dispositions and habits of learning that they have been encouraged to adopt. Adaptability, flexibility, preparedness to take risks and experiment, the ability to deal with failure and frustration, all of these can be developed through drawing. Are students encouraged to question? Are they helped to reflect on their experience? An important habit to nurture is that of independent study. For many teachers, the challenge is how to develop these capacities in students without giving too many prompts or totally structuring investigations for them.

Teachers' views

It may only be the art and design teacher who is a passionate advocate for the value of drawing. What are other teachers' and parents' attitudes to drawing? Many adults think of drawing as a skill that only certain people possess, an idea reinforced when certain students are labeled 'gifted and talented.' Some teachers may view drawing as a leisure activity. Although they may encourage students to copy maps, graphs and other diagrams from textbooks as a way of reinforcing learning, some do not see the relevance of drawing to their subject and are unaware of how much drawing can be involved in learning and teaching, so do not see it as an important learning strategy. The art, craft and design teacher might try to influence students' and teachers' perceptions:

> *By emphasizing the intellectual content of the drawing task it should make the educational purpose clearer, and possibly raise the status of the subject in the eyes of the students, as well as addressing the 'why are we doing this?' question.* Oliver Hurd-Thomas, art teacher.

Conclusions

Drawing – making marks, making meaning – offers modes of thinking that extend what can be achieved through words and numbers. It extends the range of learning strategies available to students. It develops intellectual curiosity. Drawing – it makes you think! You can learn to draw – and you can draw to learn.

References

Adams E. (2009) Power Drawing: Active Learning, CD file 1, Evaluation Report, The Campaign for Drawing.

Baynes K. (2013) Design, Models of Change: The impact of designerly thinking on people's lives and the environment, Loughborough Design Press.

Baynes K. (2010) Models of Change: The future of design education, John Eggleston Memorial Lecture, Design and Technology Education: An International Journal 15.3.

Betts S. (2011) *The Bigger Picture of Drawing: A New Curriculum, A New Pedagogy* in Thinking Through Drawing: Practice Into Knowledge, proceedings of an interdisciplinary symposium on drawing, cognition and education, (eds) Kantrowitz A., Brew A. and Fava M, Teachers College, Columbia University, Art+ Art Education, New York, USA.

Blake Q. (2000) Words and Pictures, Jonathan Cape, London.

Clarke L**.** (2011) guest ed. The Saatchi Gallery Magazine, *Art & Music*, Issue 15, Autumn, Art & Music Publications.

Claxton G. (2010) Building Learning Power, TLO, Bristol.

Garner S. (Ed) (2008) Writing on Drawing, Intellect Books, Bristol.

Glaser M. (2008) Drawing Is Thinking, Overlook Duckworth, Peter Mayer Publishers, London.

Hattie J. (2003) Distinguishing Expert Teachers from Novice and Experienced Teachers, Australian Council for Educational Research.

Hewison R. and Holden J. (2004) The Right to Art: Making Aspirations Reality, Demos.

Hockney D**.** (2012) Interview with Alan Marr at the Royal Academy exhibition 2012), www. http://www.bbc.co.uk/programmes/p00pd79w

Jerwood Prize (2012) press release, http://jerwoodvisualarts.org/3511/Jerwood-Drawing-Prize-2012/311

Kantrowitz A., Brew A. and Fava M. (2011) Thinking Through Drawing: Practice Into Knowledge, proceedings of an interdisciplinary symposium on drawing, cognition and education, (eds) Teachers College, Columbia University, Art+ Art Education, New York.

Rosenberg T. (2008) New Beginnings and Monstrous Births: Notes Towards an Appreciation of Ideational Drawing, in Garner S. Writing on Drawing, Intellect.

Ofsted (2012) Making a mark: art, craft and design education, Ofsted.

Petherbridge D. (2010) The Primacy of Drawing: Histories and Theories of Practice, Yale University Press.

Rinne P. (1999) An investigation of drawing across the National Curriculum at Key Stage 3, unpublished PhD study, University of Surrey, Roehampton.

Rosenberg T. (2008) New Beginnings and Monstrous Births: Notes Towards an Appreciation of Ideational Drawing, in Garner S. Writing on Drawing, Intellect.

Simblet S. (2005) The Drawing Book, Dorling Kindersley, London.

Witkin R. (1974) The Intelligence of Feeling, Heinemann Educational Publishers.

Bibliography Power Drawing

Books by Eileen Adams in the **Power Drawing** series published by The Campaign for Drawing are available for £5 from Central Books mo@centralbooks.com

DRAWING: IT MAKES YOU THINK! (2011)
Focuses on drawing in a range of subjects in secondary schools.

DRAWING: A TOOL FOR DESIGN (2009)
Explains how engineers, architects and landscape architects use drawing.

PROFESSIONAL PRACTICES (2006)
Illustrates how different professionals use drawing in their work.

LINES OF ENQUIRY (2005)
Shows how students in secondary schools use drawing in art and design.

SPACE AND PLACE (2004)
Illustrates how students use different drawing systems to explore space and place.

DRAWING ON EXPERIENCE (2003)
Focuses on the use of drawing in museums and galleries.