FEATURES OF EXCELLENT SCHOOLS

SOME RESEARCH BACKGROUND

Ernest Spencer

This paper summarises findings and insights from a range of research studies to clarify and explain the Dimension of Excellence "Engages pupils in the highest quality learning activities". Some parts of it are drawn from a background paper for *Learning 21: An Integrated Learning Space for the 21st Century* by Craig Brown, Louise Hayward, Nicki Hedge and Ernest Spencer (Glasgow University "Proof of Concept" Report to Scottish Enterprise Glasgow, 2004). The L21 paper drew on three Open University texts (Oates 1994, Lee and Das Gupta, 1995, and Bancroft and Carr, 1995). This review is also informed, inevitably, by its author's extensive experience as a member of HMIE. It should not be forgotten that the collective experience of HMIE includes an enormous amount of analysis of large quantities of prime data (classroom observations, discussions with teachers and pupils, pupils' work, etc, etc). HMIE has access to a much larger quantity and to a better quality of data than many researchers can achieve.

The strategy is to set out a range of research findings on learning and teaching that justify the definition of features and sub-features of high quality learning and teaching in *Dimensions of Excellent Schools*. The review concludes with a summary of key outcomes, which can easily be related to these features and sub-features. However, value judgements come into play in identifying the most effective pedagogical strategies. Different conceptions of what education is for can lead to different ideas about best practice in learning and teaching. Therefore, before setting out the research findings, a framework of philosophical ideas about education is offered and suggestions are made about where Scottish Education currently stands in relation to it.

1 What is education for?

One useful approach to exploring current thinking, debate and policy on education and pedagogy might be to consider where we stand in relation to three central ideas about the purposes of education . (This categorisation can be found, with the detailed references to the research/theory underpinning each position, in *Writing Matters Across the Curriculum* (Spencer, 1983)).

- Education is concerned with initiation into knowledge, modes of thought, social mores and skills which are inherently valuable or useful for future employment. Logic, order, cognitive development, "knowing that something is the case" are important. (Most of those holding this "initiation" view would also accept that motivation and active involvement on the learner's part are also important). These ideas have been part of our educational thinking for some time. They were eloquently advocated by thinkers such as R S Peters and P H Phenix in the 1960's (Peters, 1966, Phenix, 1964). Curriculum planning based on the idea of a "core" for all pupils reflects this view – it remains influential in Scottish education, since both the 5-14 and the 14-16 curricula are still, at least for the present, largely based on it.

- Education is for developing reflective thinking, hypothesising, problem solving, ***personal*** meaning, in the context of the learner's broad culture. These abilities, and indeed, all skills, develop in collaborative activity with other people - teachers and other learners. They become internalised, personal, through imitation, "apprenticeship" and purposeful practice of them. Knowledge is important only when acquired and used for well understood purposes. Active engagement, curiosity, intuition, imagination are important, as well as logical thought. Successful use of these complex skills provides great personal satisfaction and motivation to meet new challenges. Significant writers underpinning this view include John Dewey (1916, 1938), Lev Vygotsky (1962), Jerome Bruner (1960, 1966, 1996) and Robin Hodgkin (1970).

- Education is the process of "becoming a person", which continues lifelong and is not confined to people's experiences in schools and other educational institutions but includes all their experience of the society in which they live. It involves conscious pursuit of the goal of becoming the kind of person one wants to be – of "identity goals", as Hodgkin calls them – with the kind of knowledge and skills one wishes to have. Curiosity and self-confidence, important components of the skill of learning how to learn, lead to a sense of continuous change in oneself. One has a continuous potential to engage with new ideas, contexts and groups of people. A key source of the ideas underpinning this view is the work of the psychotherapist, Carl Rogers (1969). It is a view of education and of social experience as important means of becoming a self-confident and fully accepted member of one's community or of several communities. A sense of belonging is an important factor in everyone's emotional, personal and social development.

Many aspects of Scottish Executive Education Department (SEED) policy in recent years suggest that, while cultural legacy and personal understanding of what is studied remain important, there have been significant moves towards the broader idea that education should be a process of becoming a person – for all young people. This process includes learning about the things that society feels a need to "pass on" as valuable and building one's own understanding of key aspects of culture in the process. It also involves the development of complex thinking, learning and social interaction skills. It is a process which, of course, continues beyond school leaving age and ideally is lifelong.

SEED's *Ambitious Excellent Schools* (2004) highlights in its opening statement the idea that school pupils are in the process of becoming rounded persons engaged in social and community life. It refers also to children and young people imagining the future and shaping their own and the community's life as they pursue ambitions:

> "Our agenda for action is built on our belief in the potential of all young people and our commitment to help each of them realise that potential.
>
> We know that all of our young people can make a great personal contribution, among their families, friends, schools, communities and to Scotland as a whole, if given the chance to do so.
>
> We want them to have the self-esteem to be confident, happy and ambitious. Our agenda is focused on helping each of our young people imagine a positive future for themselves and those around them and helping them to make that future possible".

The publication goes on to identify key aims as:

- Enabling pupils to be successful learners, confident, responsible citizens and effective contributors to society
- Providing choices and the opportunity for them to realise their own potential fully
- Giving teachers and schools freedom to tailor learning to individual needs
- Developing personal support systems to ensure that all young people, including those in challenging circumstances, have equal opportunities to benefit from learning
- Meeting the full range of personal needs by integrating all children's services in Community School developments
- Arranging for training for schools and education authorities in promoting action to combat such social evils as sectarianism, discrimination and racism

These items on SEED's agenda are grounded in the *Standards in Scotland's Schools etc. Act 2000*, which places a **duty** on education authorities to secure that education aims to develop the personality, talents and mental and physical abilities of the child or young. person to their fullest potential

2 Aspects of learning/teaching research

2.1 "Brain Research"

The recent SCRE review (summarised in Spotlight 92, Hall 2005) offers a number of important reminders of what is currently known for sure about neuroscience and education, as opposed to "myths".

The review begins with a cautionary section, based on 1997 work by John Bruer, indicating that discoveries about the physiology and organisation of the brain do not lead inevitably and quickly to practical classroom applications and that cognitive psychology still has a significant role in informing educational activity.

2.1.1 Myths

One "myth" which the review considers is the idea that there are critical periods for brain development, and therefore that there may be particular significance for learning development of the first three years of life or of forms of "hot housing" of young children. Neuroscience identifies certain types of learning that **are** developed strongly in sensitive periods when the brain is particularly ready to respond to stimuli in the environment. The result of responding to environmental stimuli is enormous growth of axons (the "tails" of brain neurons that send electrical impulses to other neurons), dendrites (neurons' receptors of impulses from other neurons), and synapses (the connections between axons and dendrites). It appears that the types of learning most susceptible to these "sensitive" periods are those which occur naturally as part of our evolutionary development. They are those in which the brain **expects** visual, auditory and tactile stimuli that are constantly present in the environment and adapts itself to them. In early childhood there are sensitive periods relating to sensory and motor development and skills we are conditioned to develop by evolution, such as spoken language. Any normally stimulating human environment enables children to develop these abilities.

However, other forms of learning, which are "experience dependent", rather than "experience expectant", and which include culturally transmitted knowledge systems, occur only when the need arises for them. They do not seem to be related to particular periods when the brain is especially ready to create many synapses. Indeed, counter-intuitively, as humans develop, there is a pruning of synaptic connections between neurons and a development of insulation of axons which makes the delivery of their electrical charges more efficient. The implication seems to be that much educational learning occurs not when the brain is physically growing at its fastest rate but when it is using existing neuron connections more efficiently than in early childhood. However, neuroscience has established that "plasticity", the brain's ability to change and reform synaptic connections as a result of learning or in response to environmental changes, is particularly apparent in early childhood but not confined to it. We can continue to learn new things at every stage of life. There is less certainty about later periods of "sensitivity", but some skills, such as playing a musical instrument or speaking a second language, seem to benefit from learning that occurs before the age of 12/13 and, more

speculatively, there are suggestions that there may be a sensitive period of development of reasoning and problem-solving in teenage years.

The SCRE review argues that there are detrimental effects on brain development of deprived environments (where normal stimuli are limited) but that there is no case made by neuroscience for attempting to provide "enriched environments" for very young children in order to increase the number of synaptic connections made in the brain. There is no evidence linking synaptic densities in early life with improved learning later. However, it is notable that an earlier review of brain research and learning by Frank McNeil for the London Institute of Education School Improvement Network (McNeil 1999) argued for the positive effects of some "enrichment" programmes. This paper also highlights the relationship of emotions to successful learning, including the need for stress-free learning conditions and the contributions made to brain activity by interactions with music and other arts and by exercise and appropriate nutrition, as well as by use of language and numbers.

The SCRE review also debunks a common myth about brain laterality, that the two halves of the brain work in fundamentally different ways, the left brain managing logicality, verbal reasoning and problem-solving and the right intuition, creativity, and images rather than words. Popular accounts of this distinction are based on a gross over-simplification not supported by brain research. Neuroscience has shown that almost any cognitive function is composed of the combined action of smaller "elementary" functions. Some of these are localised, but they are widely distributed across the brain and may be performed in parallel. This suggests that we need to treat with care claims made by some popular educational "gurus" about the impact of brain studies on education. However, it probably does reinforce ideas about the complexity of learning and about the value of multi-sensory approaches to it. The SCRE review casts doubt on the belief that there is some grand scheme of "brain-based education" that can transform learning and teaching. However, it indicates that mutually beneficial links are being made among neuroscientific research, cognitive psychology and educational studies, leading to more careful and realistic drawing out of the implications for learning of neuroscience. Areas where particular benefits are emerging include literacy, numeracy, dyslexia and the link between emotion and learning.

2.1.2 Multiple Intelligences

A significant insight of genetic studies of the last 30 years or so has been the idea promulgated by Howard Gardner (1984, 1991, 1993, 1999, 2003) of multiple intelligences. A question that this theory raises is: should education be developing general or specific abilities?

Gardner's theory is related to the "modules and domains" which researchers such as Jerry Fodor (1983) regard as the basis of all human learning. This model revives older concepts of inborn capacities in the light of modern knowledge about genetics. Modules are different subsets of our neural networks, each genetically pre-structured for processing different kinds of "representations", input information from domains such as language, music, mathematics. Development, or maturation, depends on experiencing a

range of input information from the environment, but is essentially a matter of developing domain-specific skills and strategies independent of development/maturation in other domains.

In its basic form this model contrasts with Piaget's 'constructivist' theory of development. For Piaget, children move through the four developmental stages acquiring qualitatively different, more complex ways of thinking at each. They do this through processes of assimilation (trying to make sense of new information/experience in terms of their existing way of thinking); accommodation (adapting their way of thinking to take account of the characteristics of new experience); and equilibration (developing a more sophisticated mode of thought to overcome disequilibrium caused by a conflict between new experience and the previous way of thinking). Crucially, Piaget saw this development of thinking abilities not as programmed by the genes but as the construction by children of increasingly complex *general* strategies for making sense of the environment.

However, some contemporary psychologists give little support to the idea that there are *general* modes of thought particular to each stage. They consider that several types of evidence indicate that children do not go through general stages of development. This evidence includes the unevenness in children's development, (e.g., in successfully completing various types of 'conservation' task); the existence of child prodigies with very advanced abilities in a particular domain (such as mathematics); and emerging evidence that familiarity with specific context and background knowledge are key factors in successful learning. Rather, these psychologists argue, children develop a sophisticated repertoire of task-specific (or domain-specific) skills and strategies on the basis of "associations" among many similar or related experiences. In effect this is a form of complex "behaviourism", which is the way we adapt to our environment. Some researchers argue that genetic pre-specification of domain-specific learning is too limited a concept to explain the flexibility of people's actual learning behaviour within a domain. Karmiloff-Smith (1992) suggests that, rather than predetermined "modules", there are innate *predispositions* which permit learners to *develop* better adapted domain-related "learning modules", along constructivist lines.

Gardner's ideas about Multiple Intelligences seem to be akin to Karmiloff-Smith's view that development is probably domain-specific with a general element and that it involves a dynamic process of interaction between genetic predispositions and experience. Gardner (1993) argues that the development of the different modules of, e.g., linguistic, logico-mathematical, spatial, kinaesthetic and 'personal' (feelings/relationships) intelligences is genetically pre-programmed. However, he regards it as open to "developmental plasticity", and thus to educational assistance. He spells out educational implications, arguing that children's distinctive "profiles of intelligences" on entering school indicate need to provide school experiences which develop most effectively their genetically pre-programmed capacities. Serious consideration of Gardner's argument by the education system would raise many questions about the nature of the most desirable curriculum and the need for differentiation and specialisation

Perhaps less well known than that of Gardner, but of great significance is the work of Reuben Feuerstein (1991, 1997), who has challenged the concept of fixed intelligence in a different way, arguing that effective learning environments, where ideas are mediated and bridged with learners, can lead to permanent improvement in cognitive structures.

2.2 Promotion of high motivation commitment, self-esteem in respect of learning and belief that success is possible, indeed probable.

The significance of emotions in learning is widely recognised in research relating to evolutionary, behavioural adaptation to the environment and in psychological research. In recent times, reference has most frequently been made to Daniel Goleman (1995, 1998, 2003) in discussing the place of emotions, relationships and personal motivation and commitment in education. The EQ Institute website of Steve Hein, at http://eqi.org.gale.htm, contains a range of critiques of Goleman's work (selected by the site owner and perhaps in some cases rather personal), arguing that his definitions of emotional intelligence and associated terms are vague, that his work is not based on scientific study and that he has not given appropriate credit to predecessors who have developed such study. Apart from debates about the development of emotional control or the benefits of our emotions, the significance of emotional factors in learning has long been recognised in a wide range of research and theoretical writing. David Ausubel (Ausubel 1968 and Ausubel and Robinson 1969), for example, dealt at length with affective and social factors in school learning. These included attitudes to learning, the effect of personality characteristics, such as anxiety or open-mindedness, and group and social influences, such as classroom climate. Ausubel identifies three types of determinant of an individual's drive for success in school. The first is ego-enhancement, as a result of success (Ausubel refers to "competition with oneself" principally, but also to a limited role for competition among pupils). The second motivating force for Ausubel is the desire to be accepted and respected by others, one's peer group, but also other groups, such as teachers and initiates in a particular field of knowledge. Thirdly, Ausubel describes a cognitive motivating factor of which there are two forms: one arises from success in previous learning and one from interest aroused when the learner is stimulated by a challenge, a puzzle or problem, a cognitive conflict or dissonance, which makes her/him feel a need to know more.

There are clear implications of Ausubel's findings for styles of teaching and learning. They include the need for well judged intellectual challenges, for positive feedback and for an inclusive ethos. Social psychologists such as Harter (1986) have confirmed that children's sense of self-worth is affected strongly by how well they succeed in achieving their personal ambitions for school success. Despite criticism of the methodology and findings of Rosenthal and Jacobson's (1968) study of teachers' expectations and pupils' performance ("the Pygmalion effect"), a large amount of subsequent research (summarised by Biehler and Snowman (1993)) has highlighted the fact that children try to live up to teachers' expectations of them. Too low expectations or unrealistic ones without appropriate support can adversely affect learning and achievement.

2.3 Promotion of meaningful learning

"Meaningful learning" is a rich term, which can be validly interpreted at several "levels**"**

2.3.2 Meaningful "reception learning**"**

In relation to "reception learning" of a defined curriculum certain principles derived from a view of learning as "behaviour-modification" come into play. To the extent that, in practice, Scottish education continues to promote "reception learning", the five clearly defined features of teaching methodology emerging from this view of learning may remain relevant. They are:

- *(i)* identification, definition and sharing with pupils of clear aims/goals;
- *(ii)* identification of sub-goals, steps towards the overall aim(s), the place of which in the logical structure of the topic is made explicit,
- *(iii)* provision of "stimuli" in reaction to which pupils' behaviour (or learning) changes – in practice this means information, instruction and tasks and it also implies an essential requirement for the learners to do the work, to interact with the teaching and the tasks;
- *(iv)* arrangements for practice ("time on task", as Carroll (1963) termed it – the length of time spent on the work, the number of occasions when the learner is engaged in responding to the tasks – is a key factor in successful learning);
- *(v)* provision of reinforcement, usually constructive feedback from the teacher or, sometimes, through peer- or self-assessment of how the tasks have been dealt with.

This tightly structured teaching approach underpins the concept of "mastery learning", developed by Bloom (1971) (and others) from Carroll's earlier work (1963), and of "criterion-referenced assessment". Bloom argued that, with good teaching and adequate time, most pupils (80% or so) should be able to achieve defined levels of attainment. He argued also that learning should be carefully and logically structured, so that prerequisite steps/stages are achieved en route to main aims. He considered that this both facilitates success and makes it possible to write assessment items which provide information about learners' successes/strengths and failures/weaknesses in working through the prerequisite stages. Thus teaching and learning can be adjusted to take account of the achievement (or not) of success criteria. Mastery Learning and criterion referencing have an influence on current practice in Scottish schools. Their influence can be discerned behind the specification of "attainment targets" or "learning outcomes" in national curriculum guidelines and syllabuses for national qualifications. Their influence is also apparent, for example, in typical early secondary, Standard Grade and National Qualification units and courses in various subjects.

2.3.3 Meaningful learning is "deep" learning

The behaviourist model of learning is not by any means the *only* one relevant to many Scottish teachers' practice. Behaviourist ideas can be perceived within the framework of HMI Quality Indicators and other national advice on learning and teaching, but they are integrated there with several other important ideas about meaningful learning. One of

these is the distinction made by Ausubel between "rote" and "meaningful" learning. Learning is the more meaningful, the more the learner actively seeks to make sense of it in terms of things (s)he already knows. "Meaningfulness", irrespective of the mode of teaching or learning, is the crucial requirement of good learning.

Noel Entwistle (1981), drawing on the work of Marton and Saljo (1976), helpfully broadened the idea of meaningfulness through the concepts of "deep active" and "deep passive" learning. "Deep" refers to an intention by the learner to go to the heart of the meaning of a text or body of information; and "active" and "passive" relate to the extent to which (s)he does or does not seek to understand also the supporting evidence of arguments for the main points. "Deep" approaches are contrasted with "surface" ones, which concentrate on facts, examples and rote learning.

Entwistle (1988) reported findings by Marton and Saljo (1976), Dahlgren and Marton (1978), Ramsden (1979) and Laurillard (1979) relating to the influence on university students' learning approaches of teachers' expectations and the types of task set. Key points included:

- questions testing only "surface" knowledge" (e.g. straightforward facts) encouraged a rote learning approach, even in students with a natural tendency to "deep" learning;
- a rote learning approach was also reinforced by anxiety about meeting expected assessment/examination requirements, even when the actual examination questions really required "deep" learning;
- overloading syllabuses with factual information to be recalled was a third factor encouraging "surface" learning;
- periodic short answer tests were a fourth, as students realised that they could usually succeed in them by memorising a few important facts or points.

Entwistle has continued to investigate learning and approaches to studying among university students and has developed a more sophisticated conception of the relationships among teaching, assessment and learning which he considers to be applicable also to learning in the secondary sector. These ideas are set out in *Promoting deep learning through teaching and assessment: conceptual frameworks and educational contexts* (paper presented at TLRP Conference, Leicester, November, 2000, and accessible on the website of the *ESRC* Teaching and Learning Research Programme).

In the deep approach, the intention to extract meaning produces active learning processes that involve relating ideas and looking for patterns and principles on the one hand (a *holist* strategy - Pask, 1976, 1988 – see below), and using evidence and examining the logic of the argument on the other (*serialist).* Pask argued that each of us may have an inborn tendency to either holist or serialist approaches to learning, but that effective learners use both strategies in a versatile way. A deep approach also involves monitoring the development of one's own understanding (Entwistle, McCune & Walker, 2000). In the surface approach, in contrast, the intention is just to cope with the task, which sees the

course as unrelated bits of information which leads to much more restricted learning processes, in particular to routine memorisation.

Interviews with students on everyday studying drew attention to the pervasive influence of assessment procedures on learning and studying. They suggested the need for an additional category - *strategic approach* - in which the intention is to achieve the highest possible grades by using organised study methods and good time-management (Entwistle & Ramsden, 1983). This approach also involves monitoring one's study effectiveness (Entwistle, McCune & Walker, 2000) and an alertness to the assessment process, aspects which are akin to metacognitive alertness and self-regulation (Vermunt, 1998; Pintrich & Garcia, 1994). Interviews with students suggest that strategic students have two distinct focuses of concern - the academic content and the demands of the assessment system. The interest in the content is typical of a deep approach, but the alertness to assessment requirements is typically strategic (Entwistle, 2000).

A deep strategic approach to studying is generally related to high levels of academic achievement, but only where the assessment procedures emphasise and reward personal understanding. Otherwise, surface strategic approaches may well prove more adaptive.
Entwistle proposes parallel conceptions of understanding/learning and of teaching, both of which move from "surface" at one end of the spectrum to "deep" at the other. The implication is that the deep approaches to teaching and also to design of assessment tasks are needed to promote deep learning.

Levels of understanding/ learning
Mentioning Incoherent bits of information without any obvious structure
Describing Brief descriptions of topics derived mainly from material provided
Relating Outline, personal explanations lacking detail or supporting argument
Explaining Relevant evidence used to develop structured, independent arguments
Conceiving Individual conceptions of topics developed through reflection
to show the influences on learning of the interaction between students and the teaching-learning environment.

Conceptions of teaching
Imparting information
Transmitting structured knowledge
Directing active learning
Facilitating understanding
Encouraging conceptual change

2.3.4 Teachers' understanding of what they are doing

Entwistle and Smith (2000) raise an issue which highlights the significance for effective learning of teachers' own understanding of subject matter, pupils' previous learning and pedagogy. They distinguish between *target understanding* and *personal understanding*, and between historical and proximal influences on both teachers and pupils in affecting outcomes of learning. The content of an external syllabus is the result of a consultation process (and political will) which arrives at a certain content appropriate for a particular

age and ability group. That represents the formal target understanding. The syllabus, however, has then to be interpreted by the teacher, and that interpretation depends on the teacher's prior knowledge and experience, not just of the subject matter, but also of pedagogy. Those are the historical influences. Proximal influences come into play as the teacher constructs the specific object of study for the class. In doing so most effectively the teacher needs to take account of pupils' previous learning and in an emotional climate conducive to learning. These factors and social pressures affect how the pupil reacts to the target set by the teacher and the level of understanding reached. When the teacher examines the evidence of this personal understanding by pupils, it is judged in terms of the teacher's own understanding. There are important implications here for the breadth and depth of teachers' professionalism.

2.3.5 Versatile learning strategies

Gordon Pask's analysis of styles of learning (Pask and Scott 1972), Pask (1976(a)), Pask (1976(b)), Pask et al (1977)) links closely to meaningfulness. He identified two distinct approaches. "Comprehension learning" is associated with a "holist" strategy involving elaborate hypotheses, attempts to grasp the whole of a task, linkage to other topics and use of personal, idiosyncratic analogies to make sense of it. "Operation learning" uses a "serialist" approach, has a narrower focus, concentrates on details, successive steps and logic, rather than analogic links with other topics or personal experience. Pask believed that underlying natural tendencies predispose learners to one approach or the other. He showed that students with one approach having to deal with material organised on the principles of the other achieved low levels of understanding. So teachers need to give attention to this point.

However, a further crucial outcome of Pask's work was the recognition that thorough understanding of a topic usually requires a versatile approach, using aspects of both "holist" and "serialist" styles. Pask explains this in terms of learners gradually reaching full understanding through a "conversational" process in which they question and try out ideas on another person or on another part of their own mind. Full understanding is evident when the learner can explain the topic to himself or to another and apply the principles learned in a new situation. This process of questioning and explanatory conversation requires both recognition of logical steps and use of previous experience and analogies. It reinforces the idea that learners' "own words" explanations of their learning are crucial. It also suggests that "merely" finding out what a learner's preferred mode is (not in fact an easy thing to do) and adapting teaching to it is not enough. Part of the business of ensuring optimal learning is to extend learners' "natural" strategies. Pask's holist, serialist and versatile approaches are recognised by Entwistle (1998) as the most helpful for considering school and higher education learning amid a plethora of weakly defined concepts of "learning styles".

The significance of "deep" approaches to meaningful learning is relevant to current debates about the need for teaching to adapt to learners' varying learning styles or preferences. One aspect of this area of interest, related to recent developments in understanding the physical workings of the brain, as well as much older work, is the recognition that multi-sensory experiences, - e.g. hearing, seeing and feeling –

simultaneously – can improve learning. Such approaches were originally proposed for developing early reading skills by Orton (1937) and Gillingham and Stillman (1956) and have received experimental support in the findings of Charles Hulme (1981). However, claims for the benefits of multi-sensory approaches are often made at a general level or with particular emphasis on the motivating power of, e.g. audio-visual material, without addressing the issue of the meaningfulness of the learning, as defined above.

2.4 Social constructivism and meaningful learning

The overview of inspection reports in *Standards and Quality in Primary and Secondary Schools* (HM Inspectorate of Education 1998-2001 (2002)) showed that the learning/teaching Quality Indicator most frequently receiving the "Fair" judgement (i.e. strengths outweighed by weaknesses) is the one relating to "Meeting Pupils' Needs". A key element in this QI is the quality and challenge of the tasks set to promote pupils' learning.

The quality of tasks issue is closely related to a final set of very important aspects of classroom practice, which contribute to the meaningfulness of learning. These are activities drawn from the social constructivist tradition of Vygotsky (1962, 1978, 1988), Bruner (1960, 1966, 1990, 1996) and Rogoff (1991). This tradition is also represented by recent research by Black and Wiliam (1998 (a) and (b)), Black (2001), Black et al (2002) and OECD (2005) on formative assessment and classroom techniques such as sharing of aims and criteria, open questioning, comments rather than grades for pupils' work, self- and peer-evaluation and co-operative learning.

The social constructivist line of research and theory gives great significance to the role of teachers in children's learning. It also gives significance to collaboration as a means of learning, but not simply to any form of group work or interaction with other children. The meaningfulness of tasks and the extent to which discussion or collaborative activity causes individual learners to think are crucial factors.

In Piaget's constructivist theory children move through four developmental stages acquiring qualitatively different, more complex ways of thinking at each. They do this through processes of assimilation (trying to make sense of new information/experience in terms of their existing way of thinking); accommodation (adapting their way of thinking to take account of the characteristics of new experience); and equilibration (developing a more sophisticated mode of thought to overcome disequilibrium caused by a conflict between new experience and the previous way of thinking). Crucially, Piaget saw this development of thinking abilities not as programmed by the genes but as the construction by children of increasingly complex *general* strategies for making sense of the environment. Piaget argued that this cognitive development is spontaneous and a lone process, occurring irrespective of instruction. He saw language as the *outcome* of the development of symbolic functions which allow mental representation of objects/experience at the end of the sensory-motor stage at about two years old.

Vygotsky (1962) accepted the idea that, as we learn, we are always extending the understanding of the world that we had before, but he opposed the view that the learner is

a kind of lone scientist. He argued that to study children's thought apart from instruction excludes an important source of change. He argues that language, concepts, voluntary attention and memory are all functions which originate in and are determined by culture. They all occur in *interpersonal* interactions first and then become *intrapersonal* means of thinking (Vygotsky, 1988). "Social constructivism" thus, in a sense, is congruent with Piaget's "constructivism", but is also fundamentally different. It is not just that adult interaction gives support to a process of maturing and learning from experience. Vygotsky's "zone of proximal development" is defined specifically as the difference between what the child can achieve unaided in problem-solving and what (s)he can achieve with the help of adults or peers. The developmental experiences and support provided by others actually *determine* the structure and pattern of the child's thinking. Bruner (1990, 1996) developed social constructivist ideas extensively in locating all learning inevitably in the cultural contexts in which learners exist. However, Bruner does not regard learners as mere recipients of culture – he also identifies the key features of individual motivation and "agency" as critical aspects of the process of learning within the cultural framework.

In relation to school experience, a commitment (conscious or not) to a Piagetian view of development would promote a curriculum which gives pupils many experiences to challenge and expand their existing thinking schemata, without direct instruction. A commitment to social constructivism would imply focused attention to designing learning experiences which are culturally valued. These include interaction with teachers and other learners and transformation of new ideas into one's own ways of thinking. These experiences would also give children what their culture recognises as appropriate demonstration and support in progressing towards independent ability to achieve learning aims or solve problems. Wood, Bruner and Ross (1976) called this "scaffolding".

Critical elements in effective learning and teaching drawn from the social constructivist tradition are:

- the purposefulness and engaging/motivating nature of learning undertaken (there are links with Dewey's arguments for practical involvement in "real life" learning and also with Gardner's (1993) advocacy of "apprenticeship" learning in real life contexts);
- the engagement of learners in collaborative thinking, discussion, problem-solving, using knowledge in new situations;
- the modelling of such collaborative activity in teachers' interactions with class, groups and individuals;
- the provision of "scaffolding" support to help learners' achieve independence, both in understanding ideas/concepts and in participating in active search for meaning alone and in collaboration with others.

Successful ways of stimulating pupils' thinking include open, or "fat", questions, which require pupils to explain an opinion, a point of view or their understanding of a topic/idea; and class and group discussions in a classroom climate that consistently reassures all pupils that **their** view is as important as everyone else's. Many teachers are now using "wait time" to contribute to the development of this climate. They teach

themselves and their pupils that, when a question is asked, no hands should shoot up – rather, everyone should be thinking about their own point of view on it and everyone might expect to be asked to give their view. The use of this approach in the early stages of the Assessment is for Learning Programme showed that it tended to bring into the discussion and into engagement with classwork many pupils who otherwise were often "dreaming" or "coasting".

Expectation of "transformation of knowledge", personal grasp, understanding linked to previous knowledge, explanation by pupils of what has been learned is a key aspect of social constructivism. One approach that promotes transformation of knowledge into "own words" is to design work in which pupils teach what they have learned individually or in groups to others. Making clear and acting on the expectation of "own words" explanations is, of course, another important means of stimulating pupils' thinking. It demands that they make sense of new learning by linking it to what they already know and that it becomes their own. Much research evidence shows that when this kind of thinking does not happen and pupils either try to learn material by rote or make no intellectual effort to grasp it, it is quickly forgotten.

Purposeful collaborative activity to find out things, solve problems, contribute to a presentation, explain the group's work, is also a valuable means of stimulating thought, both individual and across the group. The quality of tasks for collaborative work is important. They need to be tasks that encourage/require thought and collaborative discussion and activity. Designing tasks/activities which stimulate genuine discussion is not as simple as is often believed. Some "discussion tasks", especially if they take the form of straightforward questions, can lead very quickly to a group consensus and do not succeed in exploiting the potential of discussion for learning. An important part of this potential is the value for learning of disagreement, different points of view in discussion: such "conflicts" can be means of widening individual pupils' set of relevant ideas on a topic. It is widely recognised that there is a need to "train pupils to discuss". There are aspects of such training which relate to practical needs and conventions in discussion, such as turn taking, responding, encouraging others, making contributions, etc. However, the history of various initiatives to promote discussion skills suggests that there can sometimes be too much emphasis on these "process" skills alone. To stimulate thought and the expression of different points of view genuinely engaging or controversial topics are crucial.

A key aspect of assessment for learning and of effective teaching is teachers' adaptation of classwork to take account of what they learn about pupils' thinking as work proceeds. It is often in this adaptation that "differentiation" is apparent. It may involve, for instance, challenging pupils with questions to check or extend their understanding, re-teaching or re-explaining points, asking for further justification of a point of view or explanation of an idea, inviting speculation, perhaps modifying immediate learning aims to follow a worthwhile path opened up by a pupil's ideas…

Rogoff (1991) has argued that children's and teachers' roles are really complementary: children do not merely receive teachers' guidance, they actively seek and structure the

assistance of those around them in learning how to solve problems of all kinds. She calls this kind of process "guided participation".

It is important to note that this is_a process where *both* the agency of the learner (or learners in collaboration) and teacher guidance are important. Many studies have shown that reciprocal peer tutoring has much potential for developing children's learning. However Topping (1992), reviewing the evidence of the success of this technique, argued that it worked effectively only when teachers gave pupils specific preparation and clear guidance on how to work together effectively on the task. He also reported that success was related to whether the task was well designed to promote interaction. Hardiman and Beverton (1993) showed that it is necessary for discussion strategies and roles to be taught explicitly through analysis and reflection. In Palinscar and Brown's (1986) influential study of "reciprocal teaching" of reading skills with older pupils, a crucial element was the teachers' modelling processes such as predicting, questioning, generating ideas from the text, summarising and clarifying points. Pupils then took turns to be responsible for their group's work on a text using similar processes.

Explicit demonstration and modelling of learning processes is an important means of developing metacognition, awareness on the learners' part of how (s)he goes about learning. This is important because it broadens significantly the concept of "meaningful learning" to include understanding of the process as well as of the content. It is important also in the light of Pask's argument, referred to above, that there is often a need to expand learners' strategies. Awareness of the range of relevant learning processes related to a topic or task is clearly a significant step towards such development.

All of these characteristics of effective social constructivist pedagogy emphasise the crucial importance of the teachers as leader, organiser and explainer of all kinds of learning activities and as stimulator of and respondent to learners' thinking. There are indications in research that the professionalism of individual teachers in expecting and promoting thinking in all aspects of the curriculum and of learning is more critical than specially structured "thinking programmes" (*Thinking skills approaches to effective teaching and learning: what is the evidence for impact on learners?* EPPI research review 2004).

2.6 Summary of key features of effective learning and teaching

It is arguable that all of the following key features are relevant to effective learning in most Scottish Schools, though emphases on different features will vary according to schools'/teachers' commitment to pre-determined specification of learning aims or to open, exploratory, creative activity:

- promotion of motivation to achieve, through ego-enhancement, desire for acceptance/respect of teacher and others, satisfaction deriving from success, stimulation by a challenge.
- promotion of meaningful learning, involving:

- clear aims, goals, routes;
- engagement with work for adequate time to achieve success;
- constructive feedback, much of it provided in the process of learning, rather than at a later point;
- "deep active" learning (not rote), characterised by ability to explain fully what has been learned;
- multi-sensory learning;
- versatile use of both "holistic understanding" and "logical steps" in the process of learning;
- purposeful, engaging, challenging, open-ended tasks/questions (and avoidance of tasks encouraging rote learning of facts/points or too easy consensus in group discussions);
- "guided participation", supporting pupils in active learning;
- demonstration and modelling of, as well as participation in, collaborative discussion, thinking, problem-solving;
- development, by this means, of metacognition about ways of learning

Within particular subject areas – or in specialist schools - there is potentially a debate about the need to develop specific abilities ("intelligences" in Gardner's term), possibly through "apprenticeship" approaches of the kind mentioned by Hodgkin. The debate among cognitive psychologists about the bases for learner's development also raises questions about the appropriateness of the common curriculum. The arguments of writers like Rogers (1959, 1969) about individual and group creativity and freedom to pursue one's own values also raise issues about the curriculum. There is movement towards engagement in such a debate in current thinking within SEED, HMIE and L & TS about curricular reform.

BIBLIOGRAPHY

Ausubel, D P (1968) *Educational Psychology: A Cognitive View* New York: Holt, Rinehart And Winston

Ausubel, D P And Robinson, F R (1969) *School Learning View* New York: Holt, Rinehart And Winston

Bancroft, D and Carr, R (1995) *Influencing Children's Development*, Oxford: Blackwell and Open University.

Biehler, R F and Snowman, J (1993) *Psychology Applied to Teaching*, Boston (Mass.): Houghton Mifflin

Black, P and Wiliam, D (1998a) "Assessment and Classroom Learning", *Assessment In Education* 5, pp7-68.

Black, P and Wiliam, D (1998b) *Inside the Black Box: Raising Standards Through Classroom Assessment*, London: King's College.

Black, P (2001) "Dreams Strategies and Systems: Portraits Of Assessment Past, Present and Future", in *Assessment In Education*, 8, Pp. 65-85.

Black, P, Harrison, C, Lee, C, Marshall, B and Wiliam, D (2002) *Working Inside the Black Box: Assessment for Learning in the Classroom*, London: King's College.

Bloom, B S (1971) "Mastery Learning", in Block,J H (ed) *Mastery Learning, theory and Practice*, New York: Holt, Rinehart and Wilson.

Brown, C, Hayward, L, Hedge, N and Spencer, E (2004) *Learning 21: An Integrated Learning Space for the 21st Century* Glasgow: University of Glasgow "Proof Of Concept" Report to Scottish Enterprise Glasgow,.

Bruner, J (1960) *The Process of Education*, Cambridge, Massachusetts: Harvard University Press.

Bruner, J (1966) *Toward a Theory of Instruction*, Cambridge, Massachusetts: Harvard University Press.

Bruner, J (1996) *The Culture of Education*, Cambridge, Massachusetts: Harvard University Press.

Carroll, J B (1963) "A model of school learning", *Teachers' College Record* 64, pp723-733.

Dewey, J (1916) *Democracy and Education: An Introduction to the Philosophy of Education*, New York: Macmillan.

Dewey, J (1938) *Education and Experience*, New York: Collier-Macmillan (1963 edition).

Entwistle, N J(1988) *Styles of Learning and Teaching*, London: David Fulton.

Entwistle,N J (2000) *Promoting Deep Learning Through Teaching and Assessment: Conceptual Frameworks and Educational Contexts* (Paper Presented At TLRP Conference, Leicester, November, 2000, and accessible on the website of the ESRC Teaching and Learning Research Programme).

Entwistle, N J, McCune, V and Walker, P (2000) "Conceptions, Styles and Approaches within Higher Education: Analytic Abstractions and Everyday Experience" in Sternberg, R J and. Zhang, L-F (Eds) *Perspectives On Cognitive, Learning, and Thinking Styles*. Mahwah (N. J.): Lawrence Erlbaum (in press).

Entwistle, N J and Ramsden, P (1983) *Understanding Student Learning*. London: Croom Helm.

Entwistle, N J and Smith, C (2000) *Target Understanding And Personal Understanding: A Question of Match* (under review).

Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) (2004) *Thinking skills approaches to effective teaching and learning: what is the evidence for impact on learners?* EPPI research review. London: Institute of Education, University of London

Feuerstein, R, Klein, P S, and Tannenbaum, A J (Eds) (1991) *Mediated Learning Experience (MLE): Theoretical, Psychosocial And Learning Implications*, London: Freund.

Feuerstein, R, Feuerstein R, and Gross, S (1997) "The Learning Potential Assessment Device", in Flanagan, D, Genshaft, J and Harrison, P (Eds.) *Contemporary Intellectual Assessment*, New York: Guilford Press.

Fodor, J (1983) *The Modularity of the Mind*, Massachusetts, Massachusetts Institute of Technology Press.

Gardner, H (1984) *Frames of Mind: the theory of multiple intelligences*, London: Heinemann.

Gardner, H. (1991) *The Unschooled Mind: How Children Think and How Schools Should Teach*, New York: Basic Books.

Gardner, H. (1993) *Multiple Intelligences: The Theory In Practice*, New York: Basic Books.

Gardner, H. (1999) *Intelligence Reframed*, New York: Basic Books.

Gardner, H. (2003) Three Distinct Meanings Of Intelligence, In R. Sternberg Et Al. (Eds.) *Models Of Intelligence For The New Millennium*, Washington DC: American Psychological Association.

Gillingham, A M and Stillman, B U (1956) *Remedial Training for Children with Specific Disability in Reading, Spelling and Penmanship*, New York: Sackett and Wilhelms.
Hulme, C (1981) *Reading Retardation and Multi-sensory Teaching*, London: Routledge and Kegan Paul.

Goleman, D. (1995) Emotional Intelligence, New York: Bantam

Goleman, D. (1998) *Working With Emotional Intelligence*, New York: Bantam.

Goleman, D (2002) *The New Leaders: Emotional Intelligence At Work*, Little Brown.

Hardman, F and Beverton, S (1993) "Co-operative group work and the development of metadiscoursal skills" *Support for Learning* 8, pp146-150.

Hall J (2005) *Neuroscience and Education: a review of the contribution of brain science to teaching and learning* (Spotlight 92), Glasgow: Scottish Council for Research in Education

Harter, S (1986) "Processes underlying the construction, maintenance and enhancement of the self concept in children", in Suls, J and Greenwald, A G (Eds) *Psychological Perspectives on the Self* Vol. 3, Hillsdale (N. J.): Lawrence Erlbaum Associates.

Hein, S - EQ Institute Website Of Steve Hein, at http://eqi.org.gale.htm

Hodgkin, R A (1970) *Reconnaissance on an Educational Frontier*, Oxford: Oxford University Press.

HM Inspectorate of Education (2002) *Standards and Quality in Primary and Secondary Schools (1998-2001)*, Edinburgh, HM Inspectorate of Education.

Karmiloff Smith, A (1992) *Beyond Modularity: a developmental perspective on cognitive science*, Massachusetts, Massachusetts Institute of Technology Press.

Lee, V and Das Gupta, P (1995) *Children's Cognitive and Language Development*, Oxford: Blackwell and Open University.

McNeil F (1999) *Brain Research and Learning: an Introduction* School Improvement Network Research Matters, No. 10, London: Institute of Education, University of London.

Marton, F and Säljö, R (1976) "On Qualitative Differences in Learning. 1. Outcome and Process" *British Journal of Educational Psychology*, 46, pp4-11.

Marton, F and Säljö, R (1997) "Approaches to Learning" in Marton, F. Hounsell, D J and Entwistle, N J (Eds.) *The Experience Of Learning* (2nd Ed.), Edinburgh: Scottish Academic Press.

Oates J (Ed) (1994) *The Foundations of Child Development*, Oxford: Blackwell and Open University.

Orton, S T (1937) *Reading Writing and Speech Problems in Children*, New York: Norton

Palinscar, A S and Brown, A L (1986) "Interactive teaching to promote independent learning from text", *The Reading Teacher* 39, pp771-777.

Pask, G (1976(A)) "Conversational Techniques in the Study and Practice of Education", *British Journal of Educational Psychology* 46, Pp 12-25

Pask (1976(B)) "Styles and Strategies of Learning", *British Journal of Educational Psychology* 46, Pp128-148,

Pask Et Al (1977)) *Third Progress Report on SSRC Research Programme HR 2708*, Richmond, System Research Ltd.

Pask, G and Scott, B C E (1972) "Learning Strategies and Individual Competence", *International Journal oOff Man-Machine Studies* 4, Pp217-253ROGERS, C. R. (1959)

Peters, R S (1966) "The Philosophy of Education" In Tibble, J (Ed) *The Study Of Education* London: Routledge and Kegan Paul.

Phenix, P H (1964) *Realms of Meaning*, New York: McGraw Hill.

Piaget, J (1955) *The Child's Construction of Reality*, London: Routledge and Kegan Paul.

Piaget, J (1926/29) *The Child's Conception of the World*, New York: Harcourt Brace.

Rogers, C R (1959) "Towards a Theory of Creativity", in Anderson, H H (Ed), *Creativity and its Cultivation*, New York: Harper.

Rogers, C R (1969) *Freedom to Learn*, Ohio: Merrill.
Scottish Executive Education Department (2004) *Ambitious Excellent Schools*, Edinburgh: Scottish Executive Education Department

Rogoff, B (1991) "The joint socialization of development by young children and adults", in Light, P, Sheldon, S and Woodhead, M (Eds)

Rosenthal, R and Jacobson, L (1968) *Pygmalion in the Classroom*, New York: Holt, Rinehart and Winston.

Spencer, E (1983) *Writing Matters Across the Curriculum*, Edinburgh, Hodder and Stoughton for the Scottish Council for Research in Education

Topping, K (1992) “Co-operative learning and peer tutoring: an overview”, *The Psychologist* 5, pp151-157.

Vygotsky, L S (1962) *Thought and Language*, Massachusetts: Massachusetts Institute of Technology Press.

Vygotsky, L S (1978) *Mind in Society*, Cambridge, Massachusetts: Harvard University Press.

Vygotsky, L S (1988) “The Genesis of Higher Mental Functions” in Richardson, K and Sheldon, S (Eds) *Cognitive Development to Adolescence*, Hove: Erlbaum.

Wood, D J, Bruner, J and Ross, G (1976) “The role of tutoring in problem solving”, *Journal of Child Psychiatry and Psychology* 17, pp89-100.

Legislation

Standards In Scotland’s Schools etc. Act 2000