Charles Desforges

On Learning and Teaching

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In this paper I argue that schools would be even more successful than they are now at promoting achievement if we could all learn to share and use all the knowledge we have about learning. I recognise that there is a vast body of knowledge about learning evident in the everyday practices of teachers. This knowledge is difficult to get at so it is difficult to share. There is also a small but strong body of scientific knowledge about learning to be gleaned from research. This knowledge is easy to get at but difficult to apply. The trick we need to pull is to bring practical knowledge and theoretical knowledge together to promote advanced teaching practices. I discuss some of the areas where leaders in schools might get significant return on effort in promoting pupil achievement through teaching developments based on sharing and applying knowledge about learning.

Introduction

Schools are set up to promote pupil achievement which is broadly conceived to include the acquisition of those concepts, skills, attitudes, values and personal and social qualities likely to promote self fulfilment and good citizenship. Given the rate of social and economic change, it is generally agreed that most of us will prosper best if we are committed to life-long learning. In this light, learning is the core concept of our times. From this point of view it has been argued that schools should not only promote achievement; they should also teach pupils about learning as such, in order to equip them to be life-long learners.

This aspiration places educational institutions under increasing pressure to be ever more efficient and effective. Increased efficiency will flow to the degree that schools are focused on learning and to the degree that the very best practical use is made of our knowledge relevant to learning.

Teachers, individually and collectively, are in possession of vast bodies of knowledge relevant to promoting achievement, but this knowledge is not easy to access. It is rarely written down and it is difficult to articulate. Mostly it is exemplified in the day-to-day practices of teachers as they work behind the closed doors of their classrooms. It is timely that major efforts are being put into identifying and sharing these bodies of professional knowledge relevant to learning. The Networked Learning Communities of NCSL are exemplary in this respect. Until this work bears fruit, excellent professional performance lies beyond our understanding (ie beyond our capacity to theorise) and until we can understand it, it will prove exceedingly difficult to teach other teachers from it.

Fortunately for our aspirations to enhance achievement, there is another body of knowledge about learning that is already scientifically well-established. I would go so far as to say that we know as much about learning as Sir Isaac Newton knew about motion when, in the 17th century he set out his celebrated laws. Make no mistake, scientifically these laws were and are of the utmost significance. When NASA sent rockets to the moon in the 1960s, they used Newton's physics. The 300 year gap between theory and practice is not unusual in many fields. Medicine, architecture and engineering frequently find their theories hundreds of years in advance of their practice.

By the same token, practices are often hundreds of years in advance of theory. Stockbreeders, for example, were in effect using Darwin's theory of evolution centuries before he penned it.

These theory-practice gaps should not be used to privilege either theory over practice or practice over theory. On the contrary, they should teach us to value both bodies of knowledge and challenge us to bring them into fruitful collaboration. It is useful here to refer to the learning model adopted by 'New Visions'. This model recognises three types of knowledge; that which is public (eg theoretical models); that which is private and personal (eg individual's own understandings) and that which is created in the interactions between people in working practices.

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In this model our challenge can be rephrased.

- How can we learn to understand what we do so that we can teach future generations about good practices?
- How can we learn to use what we understand about learning in the difficult circumstances of schools?
- How can we access, pool, validate and put to use the knowledge of headteachers working collaboratively?

Scientific Knowledge about Achievement

There is a vast research literature on teaching and learning. In my opinion, most of it is incomprehensible and a great deal of that which is comprehensible is not at all relevant or useful for work in schools. That being said, there are some findings which come up time and time again, are reliably established across a wide range of settings, and which are directly relevant to our challenge in that they refer directly to the school or classroom and to curriculum content rather than to the more esoteric settings of experiments. I outline these finding in the following sections.

1

The major drivers of attainment

There are only so many hours in the day, so, whatever we want to achieve, it is useful to know how we might get our best return on effort. If we are going to invest time in enhancing pupils' attainment, where might we expect to make most impact?

Margaret Wang (1993) and colleagues reviewed a massive amount of research on just this question. They examined the impact on pupil attainment of a wide range of school reform and development initiatives including curriculum development, examination reform, accountability and inspection programmes, teacher development programmes and particular teaching and learning strategies. They were able to draw up a league table of effectiveness at this programmatic level. The top four drivers of attainment are shown in Fig 1.

Fig 1. Major drivers of attainment (from Wang et al, 1993)

1. pupils' cognitive and metacognitive activity
2. flow of challenging work
3. time on task
4. home support

Far and away the most effective factor in raising attainment was activity which made pupils' minds work. Broadly described as 'cognitive activity', this includes problem-solving, thinking, analysing, synthesising, hypothesising and generally problem-directed thinking. The effect on attainment was even more enhanced to the degree that pupils were required to reflect back on their thinking, ie to think about thinking in order to learn more general lessons about managing their own intellectual processes. This reflection on thinking is generally know as 'metacognition'. Chris Watkins' (2001) paper, used in New Visions, has powerfully elaborated the notions of metacognition and learning about learning.

The second most effective factor in promoting attainment was identified as the 'flow of challenging work'. In this context, 'challenging' here, of course, refers to that work which requires the engagement of pupils' cognitive and metacognitive processes. The notion of 'flow' refers to the requirement that cognition and metacognition should not be timetabled in occasional slots. It should be continuously demanded.

The third factor was 'time on task'. The tasks in question must be challenging (as above) and it follows that the more time spent on such work the more there is a return on effort in terms of attainment.

Research has shown that a considerable amount of time in the teaching day can be lost by pupils being off task, or misused by pupils being engaged in unchallenging work. Work on maximising time spent on challenging tasks stands to return rich rewards for pupil attainment.

The fourth factor in Wang's league table is 'home support'. This is many dimensional. It involves the home sharing and promoting the same values as the school. It also involves, to some degree, extending the learning day into out-of-school time in a sense to maximise the 'time on task' factors. This challenge is of course increasingly difficult where it is most needed but the research is clear that where home support is evident, enhanced achievement follows.

2

Successful learning settings

Research consistently shows that some classroom experiences are significantly more successful than others in promoting achievement. John Bransford and his colleagues (1999) have reviewed the mass of evidence on schoolroom learning and have identified the characteristics which consistently define successful settings for learning. These characteristics are set out in Fig 2.

Fig 2. Characteristics of successful learning settings (from Bransford et al, 1999)

- learner-centred
- knowledge-centred
- assessment-centred
- community-centred

These characteristics are not in a league table. They are the ingredients of a successful cocktail. Each is indispensable.

'Learner-centred' does not refer to any Plowden romantic view of the curriculum. It refers to the well-established fact that learners always know something about the topic their teacher is about to engage them with. The learner's knowledge consists of a preformed body of concepts, skills and attitudes related to the topic in hand. The pupil's attitude might be positive or negative; their knowledge might be mistaken, misguided or plain misleading. In respect of science for example, most 10 year olds are convinced the world is flat, that an animal is a furry creature with a leg at each corner (ie birds, snakes, insects and humans are not animals) and that vision is accomplished because the eye emits rays. Whatever the case, this is the pupil's starting point and if the lesson-as-presented or work-as-enacted does not take this into consideration there exists the capacity for a great gulf to open between the teaching process and the learning process. This gulf is more than evident in, for example, the public misunderstanding of science following at least 10 years of science education. This fact calls for a profound consideration of starting points in teaching and a determination, at this juncture, to be 'learner-centred' whatever the curriculum content.

'Knowledge-centred' refers to the requirement of a successful learning setting to be complex rather than simple, rich rather than spare, challenging rather than easy. Good settings should be rich in complex material, demanding cognitive activity on the part of pupils and certainly demanding knowledge application and problem solving.

Human learners thrive on complexity which gives the opportunity for analysis, synthesis, problem solving and the like. In out-of-school life, young humans meet and learn language in all its complexity. Four years olds, for example, know that the word 'big' has many, radically different meanings and nuances as in 'big piece of pie', 'big baby', and 'big school'. Contrast this with 15 year old youngsters taught vocabulary through definitions ('stimulate' means to 'stir up'). Asked to make a sentence using the word 'stimulate', one youngster wrote, 'mother stimulated the soup'. We simplify and decontextualise at the learner's peril.

'Assessment-centred' refers to the fact that all learning settings are assessment driven. Teachers 'teach to the test' and learners quickly calculate what they get praise, reward and grades for and try to deliver that. Sadly, most classroom assessment systems provide praise for only some educational 'goods' such as effort, neatness or work completion. There is little praise for cognitive and metacognitive activity. Good learning settings have assessment systems in alignment with the more profoundly desirable education outcomes of cognition.

'Community-centred' refers to the fact that pupils spend more time out of school than they do in it and that their in-school transactions are inevitably informed and shaped by what they know and who they are within the community at large. This involves recognition, through the 'learner-centred' factor of pupils' starting points, attitudes and knowledge bases. The wide community is both a rich quarry for school/curriculum starting points and a stage on which to build extensions to the curriculum day. This approach is well illustrated in the recent work of Marsh and Thompson (2001).

These researchers worked with teachers, parents and children in the promotion of early literacy skills amongst three and four year olds. They established, through observation and interview, the literacy practices of children in the home. Finding that these focused on popular culture and media, they designed 'media boxes' as resources for literacy development both in the home and in school. In this way, the learning and teaching resources drew on the families' cultural capital and looked to build on it developmentally.

3

Losing learning in benign settings

Significant numbers of pupils do not turn up to school or turn up only to 'bunk off' physically or intellectually. These pupils constitute a major challenge to systems way beyond schooling. Most pupils however do turn up and are relatively biddable. For one reason or another however, they are less than stretched in terms of achievement. These pupils are not a problem in any direct or confrontational sense. They are, nonetheless, a great concern however benign they remain. Research has indicated the major areas where learning loses momentum or progression and hence major areas where teachers' hard work does not have a good 'learning premium'. These areas are shown in Fig 3.

Fig 3. Lost learning opportunities

- transitions
- assessment
- knowledge application
- classroom work

These 'sites of lost learning' offer ground for a rich return in terms of achievement if advanced professional practices could be brought to bear.

With regard to 'transitions,' it has long been known that when pupils move from primary school to secondary school, learning progress loses momentum (see Galton et al 1999). This problem has been seen to have both a social and an academic dimension. The social dimensions (broadly speaking, those problems of fear and anticipation on moving to a new culture) are largely successfully dealt with through programmes of pastoral care. But the academic problem remains a major concern. Many pupils make little progress on transfer and a significant number perform less well after a year in secondary school than they did in primary school. There is a strong suspicion that this problem of 'transition' operates at the home/school and the school/HE boundaries. The problem is not caused by unruly or unwilling pupils nor by incompetent teaching. It resides in systems management.

With reference to assessment it has long been suspected that the vast amount of work teachers put into grading and commenting on pupils' work gets little, if any, return in terms of advancing pupils' attainment. Black and William (1998) have recently exposed the scale of this matter and their work has been seen to have major significance in discussions about the pedagogic economy of teachers' work.

Black and William recognise that there is a place for assessment to produce grades but that we cannot expect such practice to promote learning. Such a view is a major challenge for advancing pedagogic practice and Black and William, together with partner schools, are at the forefront of developing approaches to assessment which bear directly on pupil progress and thus provide a much better pedagogic return for teachers' time.

The third area where learning is baulked, even in benign circumstances, is in regard to knowledge application. Schools world-wide are relatively successful at teaching bodies of knowledge, but they are much less good at getting pupils to be able to use and apply this knowledge in new settings or in problem solving. A classic illustration of this was provided by a national survey of mathematics attainment. This showed that 86% of 12 year olds could correctly calculate $225 \div 15$. When the same pupils were set the following problem, 'A gardener has 225 flower bulbs which he must put equally in 15 flower beds, how many bulbs will he put in each bed?' only 30% could solve it. Approximately 50% of the age cohort thus had a safe grasp of the basic skill of long division, but could not apply it where it was relevant in a problem. This failure to apply acquired skills is evident in all areas of the curriculum. It is a long standing challenge to educational systems everywhere.

The fourth site on which learning is lost even under the most benign of teaching circumstances is manifest in the large amounts of classroom work which is just that ie it is work. Much of classroom activity does not require pupils to learn anything; it is occupying rather than challenging. The work metaphor runs deep into the conception of classroom life held by most pupils and many teachers.

People 'work hard', transgressors are told to 'get on with your work', parents ask 'what did you do at school today?' Pupils working diligently in classrooms are rewarded for their 'effort' or for work completion or for neatness. The word 'learning' is not breathed and learning is not required.

This situation is well exemplified in a year six science lesson I recently observed. The lesson was perfectly managed in terms of materials and order. It was organised around a work card which required pupils to examine a range of types of paper under a microscope. They also had to note what they saw when holding the paper up to the light, when they dropped water on it and when they crunched it up. The pupils did all these things, were very busy, made neat notes, handed their books in and departed in good order. Everyone had apparently enjoyed the lesson. Sadly, nobody learned anything and nobody thought anything – at least about the structure of paper. The 'work card' was exactly that. The lesson, very common in format for classroom activity, failed on all the criteria revealed by Bransford. It did not start with any attempt to relate the work to pupils' relevant knowledge but, it was reduced to a set of very simple procedures; the assessment (implicit in the teacher's praise) was focused on neatness, good order and work completion) and the work was totally decontextualised.

Most pupils are perfectly happy with this arrangement. They expect their teachers to set them work and they are pleased to do it. Indeed they might even become difficult if not downright intransigent if thoughtful learning is required. Moving from this 'comfort zone' will not be easy, but it is essential.

These four sites (transitions, assessment, application and classroom work) involve teachers in a huge amount of industry, planning, interaction and provision and yet each is associated with very poor returns on effort in terms of pupil attainment.

Indeed, as I have suggested, in some cases (assessment), teachers' efforts are almost entirely wasted in conventional approaches whilst in other cases (transitions), current practices are associated with negative effects for too many pupils.

Some implications

There is a great deal of knowledge in the system which, if effectively applied and generalised, would have a major impact on pupil achievement. Some of this knowledge may be said to be theoretical in that it can be stated as general propositions which are derived from research (see the above 'characteristics of successful learning settings'). Much relevant knowledge is manifest in professional practice. There are teachers who have developed processes of assessment which bear directly on their pupils' progress. Other teachers are successful at teaching knowledge application. Sadly their successful methods are not written down and thus cannot be shared except with close colleagues.

These bodies of knowledge need to be brought together in efforts by communities of teachers to develop advanced teaching practices. Because time is short and there are lives beyond school, this 'bringing together' of knowledge needs to be problem-focused. I suggest the sites I have described offer the best return on our efforts. The target problems would be;

'How can we promote maximum learning progression at points of transitions in schooling? How can we fashion teachers' assessments of pupils' work so that it makes maximum impact on their progress? How can we better teach pupils to use and apply the knowledge and skills we inculcate in them?

How can we avoid the metaphor of 'work' for classroom activity and ensure that more engagement with the curriculum is about learning and demands cognitive and metacognitive activity?'

These are not to be taken as philosophical or rhetorical questions. They are straightforward empirical questions. They call for leaders who will focus schools' attention on key learning sites and help colleagues to form learning communities within and across schools to conduct those professional enquiry and development projects which will acquire and create the knowledge base on which to advance pedagogic practice. Some of this knowledge will be found in an audit of best local practice. Some of it will have to be invented in lesson development work.

A good starting point might be to examine individual lessons using Fig 2 as an evaluation and design template. Examples of school leaders working in this direction can be found on the website on 'lesson research' (referenced below in Gralton,Gray and Ruddock 1999).

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Possible lines of action

Any action must, of course, be taken in the context of personal settings. Schools have already heavily invested in development plans. CPD to raise attainment is already in full swing. What does a 'knowledge of learning' bring to the teaching party? It might be worth considering the following lines of investigation:

- Can the learning loss in benign settings be audited in your school? Where are you strongest? Where are you weakest? Where might you get best return on effort?
- Who in your network, at whatever level, is doing good work in any of these settings? Specifically, what do some teachers already know and do that might be transferable to other teachers' practices? How can this knowledge be audited and validated? How can it be represented (written down, videoed, talked about) in order to share it?
- How might pupils be involved in identifying good teaching practices. Note here that pupils are often very conservative of their safe working practices – they notoriously do not like 'challenging teaching'. There are probably good reasons for this. What does your staff know/do about taking pupils beyond the comfort zone of classroom work?
- What leadership and management functions would be necessary to initiate and sustain these lines of enquiry and professional development?

One thing is certain. In developing a professional knowledge base focused on learning there is everything to play for. Pupils will benefit directly and the profession of teaching will be enhanced.

References

Black, P and William, D (1998). **Inside the black box: raising standards through classroom assessment.** (London: King's College).

Black, P and William, D (1998). **Assessment and classroom learning. Assessment in Education: principles, policy and practice.** Vol. 5,no.1, p7-25.

Bransford, J Brown, AL and Cocking, R (eds) (1999). **How people learn: mind, brain, experience and school.** (Washington: National Academy).

Galton, M Gray, J and Ruddock, J (1999). **The impact of school transitions and transfers on pupil progression and attainment.** (London: DfEE) Research Report 131. www.lessonresearch.net

Marsh, J and Thompson, P (2001). **Parental involvement in literacy development: using media texts.** Journal of research in reading, 24, 3, 266-278.

Wang, MC, Haertel, GD and Walberg, HJ (1993). **Towards a knowledge base for school learning.** Review of Educational Research 63, 3, 249 –294

Watkins, C (2001). **Learning about learning.** (London: Institute of Education) SIN series No.13

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