NERF Bulletin
Evidence for Teaching and Learning

Issue 2 - Winter 04/05

In this issue:

NERF

National Educational Research Forum

How was it for you?

Welcome back to the Evidence Bulletin. Stocks of the first issue have swept off the shelves but you can still get electronic versions. The publication is available as a downloadable file on the NERF website at ***http://www.nerf-uk.org/bulletin***. We've had lots of feedback too – and we appreciate it all. Keep your comments coming to ***info@nerf-uk.org***. For news on future issues, see the back page.

One of our topics for this issue is healthy living. Health and Education professional interests keep meeting; healthier children perform better academically; education plays an important role in promoting health; diet and obesity is a hot topic. So we are delighted with the welcome on this page from the editorial team from ***Bandolier***, the UK's most accessed and most accessible health evidence journal.

There is something for everyone in the Bulletin, from early years upwards - and some tips on how you might make use of the evidence at the bottom of this page. Happy reading!

Welcome from Andrew Moore, Editor of Bandolier

It is a great pleasure to welcome the NERF Bulletin, ***Evidence for Teaching and Learning*** to the world of looking at evidence to make things better. ***Bandolier***, written from Oxford, has been doing this in the area of health care and healthy living for over 10 years now.

It's not easy to help busy professionals access and use best evidence. One reason is that the evidence can be hard to find, and time may be limited, unless you are some pointy-headed academic with time on your hands. And there is the question of what constitutes good evidence. In medical terms we concentrate on quality (which is about adequacy of study design and reporting), validity (could the study really tell us about what we want to know, and with useful outcomes), and size (it's no good doing studies on two men and a dog and knowing that the dog got better).

What busy professionals need is a quality-assured digest of good evidence, perhaps with overtones of what makes for good evidence, so that we can learn to judge for ourselves and not be overwhelmed or overawed by those whose only evidence is their enthusiasm and belief.

That is just what ***Bandolier*** set out to do in healthcare in 1994. After a decade on the internet, (***http://www.ebandolier.com***) it now has up to 700,000 visits a week, with over two million downloads of PDFs a year, and is one of the top 3,000 internet sites.

What we would like to see is a similar resource for education – for professionals and public. So far the NERF Bulletin looks promising, and we wish it well.

How can you use some of the evidence in this issue?

You could, for example:

* check out the way computers are stored and organised in your school/college. This seems to make a big difference to whether they are used effectively or not (see pp8-9);
* revisit the way you use small-group discussions – are you giving groups the right sort of tasks? (see p11);
* make sure you choose the learning styles you use on the basis of evidence about what works (see p7)
* try out for yourself what researchers have been telling us for nearly eighty years about students' maths problems (see p4);
* build on what you already know about interest and enjoyment in improving writing (see p12).

PS: what struck us about the evidence in this issue is how much of it – from laptops for teachers to transfer and transition, assessment for learning and the dangers of tools which stereotype students learning styles – relates to the importance of working with detailed information about individual and group needs.

Evidence for healthy living

Bandolier's10 tips for healthy living are based on solid evidence – far away from media hype. We all know about the dangers of smoking and most of us try to eat our daily five portions of fruit and veg, but how many of us know that if we:

- eat whole grain foods (bread, or rice, or pasta) four times a week we reduce the chance of having almost any cancer by 40%?
- use Benecol or equivalent instead of butter or margarine it really does reduce cholesterol, and reducing cholesterol will reduce the risk of heart attack and stroke even in those whose cholesterol is not particularly high?
- drink the equivalent of a couple of glasses of wine a day or a couple of beers, it's good for us? *(we don't recommend this for under eighteens – ed.)*
- eat fish once a week, it won't actually stop us having a heart attack but will reduce the likelihood of dying from it by half?

Check out the Bandolier site for the rest of the top ten tips plus more evidence-based information about healthy living ***http://www.jr2.ox.ac.uk/bandolier/booth/booths/hliving.html***

How can we limit some of the negative effects of summative assessment?

"If the purpose [of assessment] is to help in decisions about how to advance learning and the judgement is about the next steps in learning and how to take them, then the assessment is formative in function. If the purpose is to summarise the learning that has taken place in order to grade, certificate or record progress, then the assessment is summative in function".

Testing and other forms of summative assessment can:

- lower students' self-esteem;
- favour transmission teaching;
- create high levels of anxiety and foster resentment, anxiety, cynicism and mistrust – particularly among older students.

These are just some of the findings of a systematic review of the impact of summative assessment and tests on students' motivation for learning across the age range 4-19. The review also found that an assessment regime which puts great emphasis on summative evaluation is connected with strong student orientation towards grades and social status rather than valuing learning for its own sake. According to the reviewers, this may mean that students' experiences of summative assessment may make them less likely to continue learning.

Unsurprisingly, one of the main findings cited in the review was that low achieving pupils had lower self-esteem than higher achieving pupils. The reviewers found evidence that before national curriculum tests were introduced in England, low achieving students did not necessarily have low self-esteem. They found that this changed after we adopted our current testing regime.

But it's not all doom and gloom by any means. There was evidence in the review to show that teachers and schools can take active and effective steps to increase the positive and decrease the negative impact of summative assessment. We have highlighted some of the negative effects and some of the positive steps in the table. If you want to see them all you'll need to read the review, at

http://eppi.ioe.ac.uk/EPPIWeb/home.aspx?page=/reel/review_groups/assessment/review_one.htm

How do we know this?

Harlen, W. and Deakin Crick, R. (2002) **A systematic review of the impact of summative assessment and tests on students' motivation for learning.** In: *Research Evidence in Education Library.* Issue 1. London: EPPI-Centre, Social Science Research Unit, Institute of Education. This systematic review was conducted using the procedures for systematic review of research in education developed by the EPPI-Centre.

Black, P., Harrison, C., Lee, C., Marshall, B., and Wiliam, D. (2003) ***Assessment for learning: putting it into practice.*** Maidenhead: Open University Press. The 'King's Medway Oxford Formative Assessment Project' ran for two and a half years – from January 1999 until the summer of 2001.

Negative effects of summative assessment found in the review… and ways in which these might be addressed to the benefit of both teachers and learners
Teachers favour transmission teaching, which disadvantages and lowers self esteem of those who prefer more active and creative learning *Try using teaching approaches that encourage self-regulated learning (including collaboration among students). In the last Bulletin (available online at **www.nerf-uk.org/bulletin**) we highlighted some of the ways in which peer interaction helped develop students' thinking skills.*
Teachers may be concerned more with performance than with process *It helps if teachers provide explanations of the **purpose** of the assessment and provide feedback from testing focused upon further learning.*
Students (especially girls) have high levels of test anxiety *If you can, avoid making comparisons between students which are based on test results. Make sure that the demands of the tests are consistent with the expectations that students already know you have of them, based on their capabilities.*
Feedback that is ego-related rather than task related can orient students towards performance rather than learning goals *Use assessment to convey a sense of learning progress to students. Feedback on assessments has an important role in ensuring that summative assessments are used diagnostically to shape the next steps for the individual and the class as a whole.*
Instead of motivation and test familiarity increasing with age, older students (those aged 11 and above) feel more resentment, anxiety, cynicism than their younger peers. They are also more likely to focus on performance outcomes (scores and levels) than learning processes. They feel mistrust of standardised achievement tests *Present assessment **realistically**. Testing is far from an exact science – it's a process which is inherently imprecise and works only when it sits within a dynamic relationship with learning. Results need to be regarded as tentative and indicative rather than definitive. It's a way of moving on rather than looking back.*
Teachers' classroom assessments can be interpreted by students as purely summative, even where that isn't the teacher's intention, if the teachers are seen to be concerned with performance at the expense of process *Repeated practice tests reinforce the low self-image of the lower achieving students. They may also mean that some students achieve the required grades but without achieving the levels of understanding which the tests are designed to assess. Develop students' own assessment skills. This helps them to perceive the different purposes of assessment. Involving students in decisions about testing can enhance their self image in relation to tests too. It also helps if the school ethos is constructive and supportive rather than competitive in relation to tests.*

Bridging the gap between evidence and practice

We know these things are more easily said than done. Luckily, a recent study can also help teachers find examples of how to translate these sorts of research results into practice. These include:

- the use of questioning;
- feedback through marking;
- peer and self assessment by students; and
- the formative use of summative tests.

Teachers can find a summary of the practical details from this research plus some illustrative case studies at ***http://www.gtce.org.uk/research/assessmentstudy.asp***

'Hard, boring and irrelevant' – how can we help students overcome their difficulties with maths?

According to the government's new maths tsar, Celia Hoyles, we have been in "a quite steep downward spiral, where students are not continuing with maths at school because they perceive it as hard, boring or even irrelevant". Helping children overcome these difficulties with maths has concerned both teachers and researchers for many years, but, until recently, research has been fragmentary and received little publicity. A review published recently by the DfES has brought together a large number of such studies and made their findings publicly available.

The review found that many students – both boys and girls – have difficulties with mathematics. The aspects they have most difficulty with include: memorising number facts (such as multiplication tables), word-problem solving, representation of place value, and solving multi-step arithmetic problems. However, individual students do not necessarily have difficulty with all aspects of mathematics. For example, one student may be able to recall number facts, but have difficulty in applying them, whilst another may be able to carry out calculation procedures correctly, but be unable to remember number facts.

The reasons why students have difficulties with mathematics vary:

- some have difficulties with many academic subjects, of which mathematics is only one;
- some have specific delays in mathematics which can be resolved eventually; and
- some have persistent, specific problems with mathematics (e.g. students with **dyscalculia** or who have difficulties with reading).

What does work?

The review found that interventions where students were given individualised work were successful at helping them overcome their difficulties with mathematics. The individualised work involved teachers diagnosing their students' difficulties and planning step-by-step learning activities.

Interestingly, (given that most of us work with large classes) the amount of time given to such individualised work did not have to be very large to be effective.

How do we know this?

This evidence comes from an interpretive review of 145 international studies published between 1926 and 2004 about the nature of children's mathematical difficulties and the kinds of interventions that have helped overcome them. Although there is no information as to relative weight of evidence of the studies, the study designs are reported in some detail.

Ann Dowker (2004) ***What works for children with mathematical difficulties? DfES Research Report 554*** ***www.dfes.gov.uk/research***

Jargon Buster

Dyscalculia *is used to describe individuals who have specific difficulties with mathematics not observed in the general population, for example, an inability to recognise small quantities of objects (even as low as two or three) without counting them.*

Individualised instruction

We seem to have ignored or somehow missed the messages from research. Way back in 1926 researchers were emphasising the importance of investigating the strategies that individual children use in arithmetic, especially those faulty arithmetical procedures that lead to errors. For example, some children add up without carrying (e.g. 23 + 17 =310); others add all the digits without any reference to whether they are tens or units (e.g. 23 + 17 = 13).

One researcher quoted in the review, reported back in 1947:

'…many errors are systematic. In other words, not as many errors are accidental and attributable to carelessness as teachers are inclined to think… If the youngsters who have such incorrect rules are to be helped, the teacher should know the child's rule because the child's need is just as much to unlearn his incorrect rule as it is to learn the correct rule. To work in ignorance of his rules is to give him a feeling of confusion'.

This researcher carried out an intervention study with a group of thirty-eight 9-10 year olds who had attained low scores in an arithmetic test. The pupils were divided into two groups: an intervention group which underwent twenty minutes of individualised instruction per week for four weeks and a control group which received the usual classroom instruction. The intervention was quite specifically based on the diagnosis and correction of faulty arithmetic strategies. The programme was short and non-intensive (80 minutes individualised instruction in total.) The intervention group made five months more progress than the control group.

The earlier the better

The review found that individualised interventions were successful whenever they took place but it was better if the intervention took place at an early stage. Early interventions helped avoid students developing anxiety about mathematics. This was important because feeling anxious about mathematics was found to hinder students' progress with the subject.

There was some evidence that intervention programmes targeting pre-school children from low socio-economic groups (for example, exposing the children to mathematical games and activities and involving parents in the interventions) were effective at preventing mathematical difficulties from arising in the first place. There was also evidence that teaching assistants could, if properly trained, help individual students to overcome their mathematical difficulties. Computer-based interventions were found to have positive results, although they were less effective than interventions carried out by teachers or teaching assistants.

The review reported less favourably on the strategy of grouping students of similar ability together. Some studies reported in the review suggested that streaming and setting could have an adverse effect on some students' performance. Being placed in lower sets can lower these students' confidence and teachers may not be able to respond to individual students' difficulties or differentiate enough because they tend to assume all students in a set are of the same ability.

Watch this space …

Currently, The National Numeracy Strategy is developing materials which emphasise individualised diagnosis and correction of the errors and misconceptions shown by children with significant difficulties in mathematics (usually at least one National Curriculum level below age-related expectations).

Hand gestures say more than you think

Believe it or not, something as simple as using hand gestures, matched to the message, can make a real difference to the way students learn and perform.

One study found that about 40% of the maths problem-solving strategies taught by teachers involved both speech and hand gestures. The researchers found that when the speech and gestures were matched, most of the strategies conveyed were correct. But when there was a mismatch between the gesture and speech, incorrect strategies were often conveyed to the students in gesture. The reason for the mismatch between the teachers' speech and gestures was because they were uncertain about the best way to teach the strategies (they clearly understood the mathematics).

As well as providing more *information* for pupils, researchers have found that using hand gestures together with speech can be a powerful way of focusing pupils' *attention*. When teachers used hand gestures along with speech to scaffold tasks for children with Attention Deficit Hyperactivity Disorder (ADHD), the children were more responsive, focused longer on the tasks and were more successful in completing the tasks.

The most effective gestures were **representational** (imitating the shape or motion of an object) and **DEICTIC** (pointing movements primarily used to provide directions and attract attention).

For students, too, using gestures can aid learning. For example, one research study found that using gestures helped students make the transition from talking to writing about science. The researcher asked the students to take part in discussions, encouraging them to use hand gestures. He found the more they described and explained scientific phenomena using speech *and* gestures the greater the number of science words they subsequently used in their writing task.

Goldin-Meadow, S., Kim, S., and Singer, M. (1999) **What the teacher's hands tell the student's mind about math.** *Journal of Educational Psychology,* 91 (4) pp.720-730.

Scherr, R. E. (2003) **Gestures as evidence of student thinking about physics.** *Physics Education Research Conference,* Monona Terrace Convention Center, Madison WI, August 6-7, 2003. ***http://www.physics.umd.edu/perg/papers/scherr/***

Wang, X., Bernas, R., and Eberhard, P. (2004) **Engaging ADHD students in tasks with hand gestures: a pedagogical possibility for teachers.** *Educational Studies,* 30 (3) pp.217-229.

Jargon Buster

*Children with **Attention Deficit Hyperactivity Disorder (ADHD)** often cannot focus on details, have difficulties in following directions, are easily distracted, tend to talk excessively and frequently interrupt others.*

SCAFFOLDING INSTRUCTION WITH HAND GESTURES IS PARTICULARLY EFFECTIVE

Attention Deficit Hyperactivity Disorder (ADHD)

Does screening children for ADHD behaviour at a young age help?

Between 8% and 17% of children are extremely inattentive and hyperactive in the classroom and achieve lower grades at school than their peers. Researchers at Durham University wanted to find out if screening children at a young age for ADHD symptoms had an impact on their performance. They also examined what happened when teachers got *advice* on how to teach children who have ADHD and how to manage their behaviour.

The researchers tracked the progress of around 25,500 pupils from 900 schools over their first three years of school and used randomly assigned control and experimental groups. Schools in one group identified the children with ADHD behaviour through screening and used an information book (based on research evidence) about effective teaching strategies. Others used the book without identifying the children, the screening without the book, and some did neither.

Overall, the pupils (those both with and without ADHD behaviour) from the schools where the teachers were both given the information book and knew which pupils had ADHD symptoms, had higher Year 2 reading scores (the effect size was 0.15) than the pupils in the three other groups. Teachers in the moderate to large schools who received the information book reported a better quality of life – less stressful and more enjoyable (the effect size was 0.14).

Pupils with ADHD symptoms attending schools that received the information book alone had more positive attitudes towards school and reading (the effect size was 0.17) than similar pupils in the schools not using the book. Their behaviour also improved (the effect size was 0.26).

The researchers found a significant negative effect on the reading and mathematics scores of the children with identified ADHD symptoms whose teachers had the book (the effect size ranged between –0.16 and –0.2). Clearly, teachers found it helpful to be given information and advice on how to manage and teach inattentive and hyperactive children and they were able to incorporate the suggested strategies into everyday practice. But knowing which children had ADHD symptoms was less helpful for children themselves. The researchers suggested this is because once 'labelled' teachers focus on keeping the children happy and calm rather than pushing them to attain.

The researchers concluded that it would be beneficial and cost effective to give teachers information books about ADHD and encourage them to use them. But wide-scale early screening programmes needed further investigation.

Tymms, P. and Merrell, C. (2004) **Screening and interventions for inattentive, hyperactive and impulsive children.** University of Durham. ***http://pips.cem.dur.ac.uk/PDFs/ESRCReport.pdf***

Jargon Buster

***Effect Size** is a way of quantifying the effectiveness of a particular intervention. For example, an effect size of 0.8 means that the score of the average person in the experimental group exceeds 79% of the control group.*

How can teachers avoid disrupting the learning process?

When students enter or change schools or move into post 16 education (transfer), or even just move from one Key Stage or year to another (transition), the process can be a traumatic and disruptive experience for students and parents alike. So are we getting any better at managing this process? According to a large-scale, 2-year research study the answer is mainly 'yes' in terms of managing the *social* aspects of the change and the answer is mainly 'no' in terms of students' *learning* progress. We now have some evidence, both from this study and from an Ofsted report on early years transition, to suggest that paying attention to continuity and progression within the curriculum may help, especially when this builds on what students know and can do already so that their learning can move on.

In a major study which explored what happened before and after transfer in the middle years of education, researchers found that most of the schools they investigated were moving on from successful management of the administrative and social aspects of transfer to try to maintain continuity of student learning and well-being over the longer term. Their activities included:

- programmes offering students longer induction periods (up to two weeks) which gave teachers longer to identify their learning needs;
- a focus on teaching and learning *processes* after transfer, for example the development of study skills, introduction to problem-solving strategies and the identification of preferred learning styles (though take care when trying the latter – see page 15) ; and
- an emphasis on curriculum continuity and progression. For example, many schools are already using Bridging Units which aim to maintain student involvement in learning during the primary-secondary transfer.

Transition matters every year

The research also highlighted the importance of continuity of children's learning and motivation throughout all the other changes of year if we are to avoid the well-known Y3 and Y8 'dips'. Based on their research, they suggested that this would take a careful balance of continuity and novelty and might include:

- more accurate planning for curriculum continuity during all transitions: evidence suggests that the present Y7 curriculum is still not challenging or different enough from Y6, because primary schools have incorporated many of the features of Y7 into Y6 – a recipe for boredom and disaffection if not picked up on in Y7;
- greater use of students' prior achievement in order to inform planning;
- introducing post-transfer strategies which are known to really help students' learning, including co-operative working, effective use of questioning by teachers, and helping students evaluate their own learning (have a look at some of these strategies on page 3); and
- giving each year a specific focus so that students feel all years are important (regarding Y8, one student said 'Year 8 is the year between Year 7 and SATs [sic]'). These might involve:
  - learning goals and ways in which students can take charge of and monitor their own learning;
  - peer support – teachers could encourage informal peer support systems in the classroom;
  - providing support and encouragement to students who wish to re-engage with learning or to shed their previous anti-work attitude, by negotiating practical agendas for improvement with teachers, or mentoring by teachers; and
  - distinctive features involving new and challenging activities, such as Year 10 students mentoring younger students in the school.

Or they could be more widely focused, for example:

- engaging students in new fund-raising activities;
- new opportunities for students which reflect the growth in their social and personal maturity, such as students acting as guides to school visitors.

We have similar evidence for other age groups. A recent OFSTED report about reception to Y1 transition shows how issues of transition and transfer run right through all phases. Inspectors reported that this planning was effective and schools largely met the concerns of parents and students. But subject co-ordinators should be more involved as a group in preparing for *curriculum* progression, and teachers need to build on the learning approaches the student experienced earlier.

None of this means that we can afford to neglect the social and pastoral aspects of transition and transfer but it does mean that we should be looking harder at students' learning progression as they move from year to year and from phase to phase.

How do we know this?

This report is drawn from the evidence of a major research study focused on the middle years of schooling. We have also used the evidence from a recent Ofsted report to demonstrate that the need for curriculum progression highlighted by the research study starts with early years and is not confined to the 7-14 age group. In the next issue we hope to bring you evidence of effective transition practice post 16.

An exploration of schools' arrangements for transfer and transition on both sides of the primary/secondary phase boundary involving primary and secondary schools in 12 LEAs over a two-year period:

Galton, G. Gray, J. & Ruddock J. et al.(2003) **Transfer and transitions in the middle years of schooling (7-14): Continuities and discontinuities in learning.** London: DfES Research Report 443. ***http://www.dfes.gov.uk/research/data/uploadfiles/RR443.pdf***

An evaluation of effectiveness of transition between Foundation and Key Stage 1 in 28 schools in 9 LEAs:

OFSTED (2004) ***Transition from the reception year to year one: An evaluation by HMI.*** London: Ofsted ***http://www.ofsted.gov.uk/publications/index.cfm?fuseaction=pubs.displayfile&id=3655&type=pdf***

Learning styles

How do we know how we learn and what difference does it make?

Of all the research that has been offered to teachers in recent years, the work on learning styles has probably been the most popular. Proposals for teacher research or enquiry based networks regularly put learning styles at the heart of their work. Courses and seminars recruit large numbers of enthusiastic teachers too. The work seems to appeal to teachers' desire for a deeper response to different student needs than the traditional three levels of ability. Yet a recent systematic review of research into learning styles in the post 16 sector has shown just how careful we need to be in trying to identify students' learning styles at all ages. We could end up stereotyping students, with damaging effects on their learning and achievement. Or we could be just plain wrong.

The review by the Learning and Skills Research Centre found that many learning styles models are weak and unreliable, and using them has a negligible impact on teaching and learning. The review also found a variety of problems with learning styles research.

The biggest problem with such research is that it is fragmentary, confusing and contradictory. There are a great many researchers working in the field. They come from different disciplines (such as psychology, sociology and business), work in isolation, use different terminology and disagree with one another's recommendations for teaching and learning strategies. For example, some researchers suggest matching the tutor's teaching style with the students' individual learning styles whilst others suggest learners should develop a repertoire of styles.

According to the reviewers, the field is shaped by the interests of academic researchers, and commercial companies keen to make a profit, with the result that the claims for learning styles tools are sometimes exaggerated – here's one example the review found:

'Within six weeks, I promise you, kids who you think can't learn will be learning well and easily'.

Researchers also disagree over the advice they offer teachers, and their advice is sometimes too vague to be helpful. For example, the suggestion in one textbook – 'restructure the classroom environment to make it more inclusive rather than exclusive' – will leave teachers wondering how they might achieve this.

The reviewers compared their findings on learning styles with major reviews of research evidence about the impact of other interventions. They reached the conclusion that the evidence was more robust and extensive for both thinking skills and assessment for learning than for learning styles.

> Interventions targeted at improving thinking skills produced an average gain in attainment of 26 percentage points, whilst the formative assessment experiments produced typical effect sizes of between 0.4 and 0.7 - larger than those found for most educational interventions.

That the use of learning styles models has relatively little impact is not really surprising in the light of the reviewers' discovery that some learning styles models were never intended for use in educational contexts, but were designed for use in commerce and industry. The researchers did find two learning styles models to be both sound and potentially useful in the context of post-16 education. They were:

- Entwistle's 'Approaches and Study Skills Inventory for Students' (as a basis for discussing effective and ineffective strategies for learning, for diagnosing students' existing approaches and as an aid for course, curriculum and assessment design, including study skills); and
- Vermunt's 'Inventory of Learning Styles' (as a basis for assessing approaches to learning and for discussing changes in learning and teaching with students).

But they cautioned that as these were developed with university students they would need to be redesigned before being used with post-16 students, or with other ages and phases.

The reviewers also commented on some of the pitfalls of using learning styles:

- sometimes simplistic judgements are made about students' learning styles so learners are stereotyped. Learners who view themselves as, for example, 'low auditory kinaesthetic learners', may see little point in reading a book or listening to anyone for more than a few minutes; and
- learning styles can lead teachers to emphasise attitudes and skills at the expense of subject knowledge.

Too much is expected of relatively simple, self-report tests (one test for example, consists of just twelve sets of four words to choose from), leading the reviewers to advise against basing an intervention solely on any one of the learning styles diagnostic tools.

So, although we know that learning styles may well be a useful way of raising students' self-awareness by diagnosing how they learn and showing how they can enhance their learning, it does matter very much which learning styles model is used. We should also be wary of over-emphasising attitudes and skills at the expense of subject knowledge, or overlooking other interventions which the research shows can have a powerful effect on student learning.

How do we know this?

Should we be using learning styles? What research has to say to practice. Frank Coffield, David Moseley, Elaine Hall, Kathryn Ecclestone. Learning and Skills Research Centre, 2004. ***www.lsrc.ac.uk***
(A systematic review of the literature on learning styles)

Getting the most from ICT

What are the barriers and how can teachers overcome them?

In the first issue of the Bulletin, we reported how ICT could have a positive impact on learning provided teachers used the resource effectively. Examples included using ICT to teach students how to interact with each other and work collaboratively, and planning an intervention which helped students to make connections between the learning they did with ICT and learning in other situations. Yet, it appears from the statistics that ICT is being underused in schools. If ICT can be such a valuable resource, why don't teachers make more use of technology in their lessons?

Why are teachers so reluctant to use ICT?

A study commissioned by Becta (2004a) found the most significant factor to be a lack of confidence in using ICT. Other factors resulting in low levels of ICT use contributed to teachers' confidence levels. They were:

- inappropriate training – courses which lacked an emphasis on teaching and learning and an element of ICT skills training;
- lack of time for teachers to become acquainted with hardware and software and to fully prepare materials for lessons;
- lack of personal (including home) access to resources; and
- technical problems, which some teachers cited as a reason for avoiding using ICT altogether in lessons because old and poorly maintained equipment was "likely to cause disruption even to the best planned lessons".

Another cause of low ICT use was limited access to school equipment – not necessarily because there was not enough equipment available, but because the available equipment was inappropriately organised. Some teachers explained that their schools' hardware was kept and used in ICT suites and that this caused a problem when several teachers wanted to use the rooms at the same time: "Usually they are double booked. I have two computers in my lab (I teach science), but this is not enough to service a class of 24-28 pupils".

Resistance to change was another cause of low ICT use – either teachers were unwilling to change their teaching practices or schools were unable to re-organise to facilitate innovative use of ICT. Some teachers were unaware of the advantages technology can bring. A number of the teachers Becta surveyed referred to inappropriate software such as "a reinforcement activity program [which]… is just presented as sums and might as well be done with paper/whiteboard etc".

Becta also found some evidence that teachers' gender has an effect on the degree to which they use ICT. Male teachers make more use of ICT than female teachers and female teachers reported greater levels of computer anxiety than male teachers. (Interestingly, despite this primary schools use ICT more than secondary schools.) But there was little evidence to support the commonly held view that age affects levels of teachers' ICT use. You may be surprised to know that younger teachers are no more likely to make use of ICT in their work than their older colleagues.

What helps to increase teachers' use of ICT?

Teachers said that their willingness to use ICT would increase with greater confidence. Both training and greater access to computers were thought to be important. One teacher said that "adequate training is needed to allow teachers to feel competent in what they are doing". Another suggested "teachers who have a laptop to take home end up making more use of ICT…it lets them develop confidence".

Ensuring access to reliable systems when required was also important to teachers. One teacher thought this depended on having an "on-site ICT manager to support teachers in lessons". Just knowing the educational benefits of using ICT, either through making teaching and learning more effective, or by enabling kinds of learning that were not possible without ICT, was found to be important too.

CPD IN ELEMENTARY GAMEBOY TECHNIQUES

The research showed a number of school factors which made successful classroom use of ICT more likely:

- effective school leadership that enables teachers to engage in innovative practice;
- whole-school planning that builds on an assessment of the school's needs;
- a whole-school approach to accessing and sharing resources that match teachers' needs; and
- professional development opportunities that take account of teachers' existing expertise.

A number of external factors also helped schools improve the use they made of ICT:

- working closely with the local community;
- local schools working together to identify and share successful practice and to motivate teachers;
- teachers linking with other teachers through electronic networks; and
- teachers becoming involved in the design of locally based training.

Based on these research findings, Becta (2004b) suggested that participating in national ICT developments, projects and initiatives can be helpful in promoting ICT use and that teachers could benefit from better access to research and the dissemination of good practice. So we have found some evidence-based examples to whet your appetites.

Examples of how ICT can enhance learning

Examples of how confident teachers have used ICT to improve their students' learning, thus helping to raise achievement, include:

- helping pupils to manipulate shapes, to bridge the gap between the concrete and the abstract;
- increasing levels of participation and discussion by the class; and
- helping a pupil with special educational needs (SEN) overcome some of the barriers to his learning and improve his engagement and behaviour.

Mathematics

This example is from the InterActive research project at Bristol University. The teacher used ICT to help her Year 5 pupils learn the mathematical properties of quadrilaterals and triangles. First, the teacher used an interactive whiteboard with the whole class, then the pupils worked at the computer in pairs, using software that enabled them to manipulate quadrilaterals (four-sided shapes) on the computer screen. When working at the computer, the pupils continued the process started by the teacher with the interactive whiteboard, of recording all the properties (both mathematical and non-mathematical) they noticed about a particular quadrilateral. Throughout the six sessions, the pupils focused on the properties of polygons. This involved noticing both mathematical and non-mathematical properties. For example, one pair of pupils wrote beside a parallelogram: "It has four sides, they are like train tracks, they are parallel, all sides are equal, it doesn't have any right angles, it's the colour turquoise, it can be a diamond".

It was evident that manipulating geometrical shapes on a computer screen helped the pupils pay attention to similarities and differences between properties of different shapes. Using the interactive whiteboard helped make all the pupils' developing conceptions visible to the whole class. Based on assessments made of the pupils and from interviews with them, the researcher reported that ICT had played an important part in improving the pupils' learning of the mathematical properties of quadrilaterals.

English

Ofsted described how ICT enhanced a Year 10 English lesson in which a lower set was engaged in studying the Spielberg film *Minority Report*. Using extracts from the film, the teacher zoomed in on close-ups, freezing the film for discussion of camera techniques or special effects. Simultaneously, as a scene from the film was being watched, he deployed the Writer's Toolkit program to model the writing of notes. Ofsted suggested the effective use of ICT in this lesson led to a detailed analysis and discussion of film effects that would not have been possible through any other medium.

Special Educational Needs (SEN)

Ofsted also gave an example of how using ICT enabled a pupil with special needs to participate and achieve in literacy lessons. A Year 6 autistic pupil, whose handwritten work was poor, was taught all the technical skills required to word process on his laptop. He also used his laptop to see what the teacher wrote on the interactive whiteboard more clearly, as the teacher's writing appeared on his laptop screen. Using ICT helped improve this pupil's motivation, self-esteem and performance. He found writing frustrating when he didn't use his laptop, which aggravated his potentially disruptive behaviour.

In a survey quoted in the first review (Impact 2, Harrison et al., 2002 ***www.becta.org.uk/research***), 700 pupils and students at each of three Key Stages were asked how often they used ICT in English, mathematics and science lessons.

Percentage of pupils who reported never or hardly ever using ICT in lessons

Key Stage	English	Mathematics	Science
KS2	38%	53%	75%
KS3	61%	67%	69%
KS4	71%	81%	70%

The statistics showed that pupils tended to use ICT in English lessons the most and science lessons the least, particularly at KS2, and as they progressed through the key stages they used ICT less often. The report indicated that some teachers at KS3 and KS4 preferred to avoid using ICT during the time their students were preparing for public examinations.

How do we know this?

An interpretative review of international research published between 1993 and 2003, relevant to the theme of barriers to the uptake of ICT by teachers and an opportunistic survey of 226 teachers attending an Education show or visiting the Becta website form the evidence. The review is interpretative because it was a study of a selection of the literature in this area and was not intended to be a systematic review, where appropriate databases are comprehensively searched and systematic criteria applied to both the selection and the evidence weighting of the studies.

Jones, A. (2004) ***A review of the research literature on barriers to the uptake of ICT by teachers,*** Becta.
http://www.becta.org.uk/page_documents/research/barriers.pdf

A companion interpretive review of 42 studies about the use of ICT and an opportunistic survey of 456 practitioners visiting the Becta website.
Scrimshaw, P. (2004) ***Enabling teachers to make successful use of ICT.*** Becta.
http://www.becta.org.uk/page_documents/research/enablers.pdf

Case studies within the ESRC TLRP programme which examined ways in which new technologies can be used in educational settings to enhance learning. Pre and post-test diagnostic tests and interview data were used to evaluate the projects.
Sutherland, R., Breeze, N., Gall, M., Goodwin, S., Matthewman, S., Shortis, T., and Triggs, P. (2002) ***Pedagogy and Purpose for ICT in Primary Education,*** presented at an international working conference organised by the IFIP Working Group, Manchester 2002. ***http://www.interactiveeducation.ac.uk/out_sut.pdf***

An evaluation of government ICT initiatives using data drawn from a range of Ofsted inspection reports on individual schools between April 2002 and December 2003.
Ofsted (2004) ***2004 Report: ICT in schools – the impact of government initiatives. Primary schools,*** HMI 2217, May 2004.
http://www.ofsted.gov.uk/publications/index.cfm?fuseaction=pubs.displayfile&id=3653&type=pdf

Ofsted (2004) ***2004 Report: ICT in schools – the impact of government initiatives. Secondary English,*** HMI 2186, May 2004.
http://www.ofsted.gov.uk/publications/index.cfm?fuseaction=pubs.displayfile&id=3648&type=pdf

Ofsted (2004) ***2004 Report: ICT in schools – the impact of government initiatives. Secondary mathematics,*** HMI 2185, May 2004.
http://www.ofsted.gov.uk/publications/index.cfm?fuseaction=pubs.displayfile&id=3646&type=pdf

Teacher confidence and teaching and learning in data handling: an illustrative case study

This round up page takes an evidence informed approach to exploring how teachers respond to data.

How much of the 'downward spiral' in mathematics (see page 4) comes from a lack of confidence in teaching mathematics on the part of teachers? Struck by research evidence that many teachers showed a significant lack of confidence in teaching mathematics, two teachers set out to examine the effect of teacher confidence on pupil confidence and pupil achievement. They discovered that difficulty with teaching data handling was a substantial issue in their own two schools and that the teaching of probability was regarded as being particularly difficult. They also found that:

- teacher confidence affected pupil confidence and hence pupil achievement in mathematics, especially data handling skills; and
- reliance on a published mathematics scheme adversely affected teacher confidence in teaching data handling and children's achievement in this area.

As a result of their research, the teachers believed they had established a clear link between teacher confidence and pupil achievement in their schools. Following carefully targeted CPD, during which data handling assumed a high profile in both teachers' schools, staff confidence increased significantly, as did pupil achievement, particularly in the data handling aspects of the mathematics curriculum.

This was a small (though rigorous) case study so it is not possible to generalise from these results. You will need to take your knowledge of your own working context into account in considering whether the case study is relevant to your situation. But the teachers did pose a number of questions and recommendations for colleagues from the evidence in their own schools:

- *Do you understand progression in teaching data handling? You need to have a bank of data handling ideas as a basis for developing meaningful hands-on experiences for the children.*
- *Do you understand the concepts behind the teaching of probability? If not, INSET has to be carefully tailored to your needs to raise your confidence and hence your children's achievement.*
- *Are you sure that the data handling experiences you offer your children are sufficiently challenging, particularly if you use a published mathematics scheme? Our study revealed that over-reliance on a published mathematics scheme impacted on teacher confidence and pupil achievement.*
- *Are you entering test results onto computer spreadsheets? If you do, trends will be perceived, problem areas isolated and addressed and targets identified.*

The authors used structured observations, questionnaires, semi-structured interviews and test results to collect the data for their case study in two lower schools.

A. Raiker and R. Price (1999) ***Teacher confidence and teaching and learning in data handling***, TTA.

(See page 14 for some suggestions about data sources for teachers and sources of data-handling ideas to use with students.)

Numbers can be jargon too ...Try this

"In a standard knockout competition, such as a singles tennis tournament, if there are four players then there will be three matches in total – two first round matches and a final. If there are eight players there will be seven matches in total – four first round matches, two second round matches and a Final. Sixteen players leads to fifteen matches and so on. It seems that for any number (n) which is a multiple of two, there will be n-1 matches in total. If n is not a multiple of two, then unmatched players will have a bye in the first round. How many matches would be needed in total for a tournament of 43 players? How could you prove your answer?

"Before you start working this out with paper and pencil, consider the following. Each match has two players and only one of them goes through. So each match eliminates one player. Therefore, however many players there are, the tournament needs n-1 matches (42 matches for 43 players.) ……."

Simple? Yes, but the problem was phrased in such a complex way that many readers start looking for a complex answer. Stephen Gorard's analogy helps to show that once the problem is phrased more simply, the solution is obvious. Not that representing complex issues simply is easy. As he says, it takes hard mental work for someone. But once done, the simpler representation is easier to work with, easier to communicate and easier to teach.

The Economic and Social Research Council (ESRC) are also trying to increase the confidence and skills of education researchers in handling statistical data through the work of the Research Capacity Building Network, which is part of the Teaching and Learning Research programme. According to Stephen Gorard, we make life too difficult for ourselves by not simplifying the way we think about and represent probabilities.

All of us, including researchers, tend to overcomplicate simple issues, therefore increasing the reluctance of busy and often unconfident practitioners to engage with research and evidence. Gorard's paper concludes that confidence with probabilities can be improved. He uses a number of examples to show how statistics can mask simple frequencies and shows how we "can get better at dealing with probabilities simply by expressing them more naturally".

Gorard, S. (2003) **Anyone can calculate conditional probabilities,** *Building Research Capacity,* pp.9-11. ***http://www.cf.ac.uk/socsi/capacity/Journal/issue5.pdf***

See also Gorard, S. (2001) ***Quantitative methods in educational research: the role of numbers made easy.*** London, Continuum.

Using small-group discussions in science teaching

Small-group discussions have been strongly advocated as an effective teaching approach in school science for a number of years. But what do we really know about whether and how small-group discussions work? Given the competing claims for interactive, whole class teaching, the work of the Science Review Group, based at York University, is timely. Their first systematic review of research into the use of small-group discussions found evidence that the composition of the groups, the nature of their set tasks and the ways in which the discussion is scaffolded all have the potential to make a difference.

The use of small-group discussions resulted in a significant improvement of students' understanding of evidence when:

- students in the groups held diverse views and understandings; and
- the use of an external stimulus gave students conflicting views.

They also found evidence that gender plays a role in determining the interaction style for developing students' explanatory understanding. All-male groups confronted the differences in their individual predictions and explanations, all-female groups searched for common features, and mixed groups progressed by turn-taking.

(For more of the review findings you'll have to read the summary at ***http://eppi.ioe.ac.uk/EPPIWeb/home.aspx?page=/reel/review_groups/science/review_one_abstract.htm*** *– but remember that they are only the beginning. The reviewers want to see much more research focused specifically on small group discussions as opposed to 'collaborative' learning generally).*

What are small-group discussions?

Whatever model is used, small-group discussions need to be structured. So Bulletin readers might find the reviewers' own research-based model for small-group discussions helpful as a starting point for thinking about what would work for your students. Their model:

- involves groups of two to six students;
- has a specific stimulus (for example, a newspaper article, video clip, prepared curriculum materials);
- involves a substantive discussion task of at least two minutes;
- is either synchronous (that is, face-to-face) or asynchronous (that is, mainly IT-mediated); and
- has a specific purpose (for example, individual sense-making, leading to an oral presentation or to a written product).

The review also offers examples of some of the ways in which small-group discussions have been structured. These include:

Envoying: when students work in two groups. In the first group, they discuss a common task, which differs for each group. Groups then reform, with new groups containing one member of each of the original groups, who act as envoys to report on their particular task.

Snowballing: In a 'snowball' exercise, pairs of students discuss a question or idea and agree on their views, then join with another pair to share what they have discussed, and then finally with another group of four (two pairs) to share thinking for a final time.

Four corners: The teacher chooses a topic and the students then brainstorm related sub-topics. Through a process of elimination, four topics are identified and one each is allocated to students grouped into the four corners of the room. The groups then choose a leader, a recorder and a reporter. The topics are discussed in the groups and the reporter then summarises them for the rest of the groups.

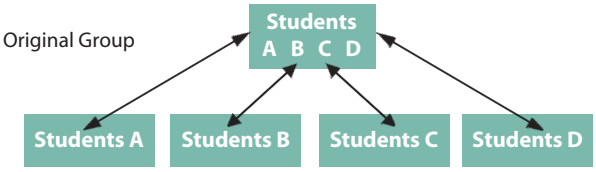
Jigsawing
We looked for a case study to see how this worked in practice. Here it is:

Case study – using the Jigsaw method in chemistry

A target group of 69 thirteen to fifteen year olds studying chemistry who were identified by their teacher as lacking motivation were split into two groups – one group used the Jigsaw method and the other group carried out its work individually.

Jigsaw Method

The academic material was divided into small parts and each member of a group was assigned one part of the classwork to study. The students were then reorganised so that they joined with others who had read the same piece of work and were asked to discuss the material together. After the discussion each student returned to their original group and taught their part to the other members, so that at the end, all had learnt the whole subject.



Results

The group in which the Jigsaw method was used showed an increase in motivation. The students who had previously seemed disinterested actively participated in the lesson. Conversely, the control group did not display the same motivation, interest or participation in the classes

How do we know this?

This article draws on two different sources of evidence:

Bennett, J., Lubben, F., Hogarth, S. & Campbell, B. (2004) **A systematic review of the use of small-group discussions in science teaching with students aged 11-18, and their effects on student's understanding in science or attitude to science.** In: *Research Evidence in Education Library.* London: EPPI Centre, Social Science Research Unit, Institute of Education. The reviewers systematically searched bibliographic databases and journals. Because the reviewers found only a small number of relevant studies they described the findings as tentative. Their next review will link patterns of success (and lack of it) to the nature of the small-group discussions concerned. The subsequent reviews will look into the contribution different types of stimuli make to students' learning of evidence.

Barbosa, R., Jofili, Z. & Watts, M. (2004) **Cooperating in constructing knowledge: case studies from chemistry and citizenship.** *International Journal of Science Education*, 26 (8) pp.935-949 (Case Studies).

Jargon Buster

Case study: *Intensive, detailed description and analysis of a single project, program, or instructional material in the context of its environment.*

Scaffolding: *the process by which an expert provides temporary support to learners to help bridge the gap between what the learners know and can do (zone of proximal development) and what they need to be able to do in order to succeed at a particular learning task.*

What factors influence the development of writing competence?

As primary teachers know only too well, literacy development is supported by plenty of research on how children develop reading and oral language skills, but comparatively little on the development of their writing. Predictors of writing competence in 4-7 year old children tracked children's writing development in their home and school environments as they progressed from pre-school through Key Stage 1. Contrary to the views of some educators, the authors' findings suggest that handwriting fluency is an essential prerequisite to compositional fluency. Perhaps more importantly, children's attitudes to writing are the foundation stone of all writing development. And the nature of the writing tasks themselves can be crucial in the development of children's attitudes towards writing.

The comprehensive study explored the processes involved in learning to write:

- during the pre-school period;
- at school entry; and
- as it then developed during their first three years in school.

Past research has established that:

- children with varied, regular writing experiences progress better than those with fewer and narrower writing opportunities;
- the writing experiences of many pupils in British primary classrooms have been 'fragmentary and discontinuous';
- there has been little awareness by teachers of appropriate developmental expectations and hence little progression in teaching writing;
- motivated writers enjoy both the activity and the completion of a task;
- those anxious about writing generally say they don't enjoy it, procrastinate, or avoid writing, and have difficulty generating content;
- teacher assessments of a child's attitude to writing relate strongly to that child's actual writing ability.

This study set out to identify the variables associated with pupil competence in writing, to establish:

- what it was in their early home environment which affected writing development in preschool children;
- what measures of writing and related skills (including child characteristics) at school entry affected subsequent writing development; and
- the relationship between teacher assessment of children's attitudes about writing, and their writing competence at the age of 7 years.

The study found that the following preschool variables were significantly associated with writing proficiency at school entry:

- mother's educational level;
- family size;
- parental assessment of writing; and
- a measure of home writing.

Yet - importantly for schools and their role in teaching writing skills - only one of the above preschool variables (home writing) still maintained a significant relationship to writing by the end of Key Stage 1.

Of the actual child characteristics, skills and competencies that were measured at school entry the ones that seemed to continue to be significantly associated with writing by the end of Key Stage 1 were:

- season of birth;
- vocabulary score;
- pre-reading skills;
- handwriting; and
- proficiency in writing name.

The school variable most strongly associated with development of writing at 7 years was the teacher assessment of the child's attitude to writing - both at school entry and in the final term in Key Stage 1. Indeed, the teacher ratings on writing attitude appeared to be more helpful than ratings on more easily quantifiable measures such as writing or reading performance. The authors suggest that this may not just be a reflection of the child's attitude as assessed by the teacher, but in fact be the indicator of a positive interaction around writing between the child and the teacher. **An implication of this finding is that engaging a child's interest and enjoyment is an important part of promoting writing development. Teachers and schools need to be aware of the importance of providing writing tasks that pupils can see as purposeful and valuable.**

Finally, although some educators argue that the most important aspect of developing writing is compositional, and that the way the letters are being formed is less important, this study suggests otherwise. It found that a basic level of competence with handwriting was required before children were able to compose something that they could read back and which could be accessed by a wider audience. This, say the authors, confirms that the development of handwriting fluency appears to be significantly related to the development of compositional skill and fluency for children in the early stages of learning to write.

How do we know this?

Dunsmuir, S. and Blatchford, P. (2004) **Predictors of writing competence in 4-7 year old children,** *British Journal of Educational Psychology*, 74, pp.461–483.

This longitudinal study examined sixty children attending four primary urban schools over their first three years at school (i.e. from pre-school to the end of Key Stage 1).

The data were collected from termly writing samples, semi-structured interviews, questionnaires, observation schedules and standardised assessments. Although the data were collected between 1993 and 1996 they were discussed in terms of the subsequent National Literacy strategy.

Jargon Buster

A variable *– This is a number, amount or situation which can vary. In most studies one variable is manipulated (independent variable) to see the effects it has on another (dependent variable) e.g. the style of teaching may be manipulated to see the effects it has on pupil achievement.*

What do we know about classroom strategies which help?

Schools and colleges face the challenge of engaging pupils of all ages who demonstrate a range of "difficult" behaviours – from fiddling with pencils, calling out in class and interfering with other pupils' possessions to aggressive behaviour such as arguing, fighting and name-calling, or refusing to work with adults and other pupils.

As is often the case, responses fall into two camps. On the one hand, it is suggested that as long there is high quality teaching and learning and an effective policy for dealing with emotional and behavioural problems then difficulties during lessons largely disappear, leaving teachers free to get on with the job of helping everybody learn more. On the other hand, there are those who regard the twin tasks of raising standards and being inclusive as a real conundrum. If you are busy supporting pupils with emotional and behavioural difficulties (EBD) all day, they argue, how can you put the energy you need into enhancing pupils' learning?

Meanwhile teachers faced with poor behaviour in their classrooms have to do something to improve the immediate situation. Some teachers use rewards and sanctions to promote acceptable behaviour in response to particular problems, while others might use resource intensive withdrawal units to contain acute problems. Some teachers work actively with parents. What all of us would dearly love to know is which of the many strategies being used really work.

Over the years, surprisingly few teachers' experiments with approaches for improving behaviour during lessons have been researched. But a recent systematic review of all the studies in primary education published over the last thirty years or so has come up with evidence that a small number of strategies have worked either for resolving immediate problems or over a longer time scale. The review found sound evidence of positive effects linked to three types of strategy:

- training programmes for pupils;
- arranging pupils' tables into rows; and
- using rewards and sanctions.

One study involving primary school children stood out from all the rest. This involved an eight-hour training programme in which seven to nine year old children were taught how to monitor their own behaviour. The big difference from the other strategies was that the positive effects of the approach on the pupils' behaviour lasted for several months after the intervention had finished. During the programme an adult modelled and explained to the children how to behave appropriately. The pupils practised what they were being taught and used cue cards to remind them how to behave in class.

The approach was based on the theories put forward by the psychologist Lev Vygotsky. According to Vygotsky, learning first occurs in a social setting and is then internalised. The training programme was designed to help the children gradually internalise the demonstrated behaviour.

The other interventions were all effective at improving pupils' behaviour in the short-term – either during the intervention itself, or immediately following the intervention, but none of the other studies included in the review reported any long-term effects. This was either because:

- they did not investigate the long-term impact of the approach – for example, one study investigated the effects of arranging the children's tables in groups and rows each for a period of two weeks. Seating the children in rows was found to improve the concentration and engagement of the most easily distracted pupils; or
- they found that the interventions only worked whilst the intervention was taking place – for example, several studies found that rewards and sanctions using token systems (e.g. ticks on a chart) were effective at reducing pupils' off-task and disruptive behaviour, but when the rewards and sanctions were withdrawn, the pupils' behaviour reverted to how it had been before.

The reviewers also reported on a number of other interventions, but they considered that further research was needed to determine whether or not they are effective.

Editor's note: Behaviour management is a burning issue for teachers of students of all ages. Much more research is needed, particularly at secondary and post 16 level.

How do we know this?

Evans, J., Harden, A., Thomas, J. and Benefield, P. (2003) ***Support for pupils with emotional and behavioural difficulties (EBD) in mainstream primary classrooms: a systematic review of the effectiveness of interventions***,. *In: Research Evidence in Education Library.* London: EPPI-Centre, Social Science research Unit, Institute of Education. ***http://eppi.ioe.ac.uk/EPPIWebContent/reel/review_groups/EPPI/EBD/EBD1.pdf*** (A systematic review using EPPI centre methodology)

Case study – training children to monitor their own behaviour

A target group of fifty-five seven to nine year olds, identified by their teacher as showing off-task behaviour, were put randomly into two groups – one group received the training programme, the other (the control) did not. The training programme, which ran for an hour a day over eight days, consisted of three key elements:

Modelling

The children watched an adult performing a target behaviour whilst talking out loud about the behaviour. For example, to demonstrate how to respond appropriately in class to a teacher's question, the adult said, 'If I shout out the answer, others will be disturbed. I will raise my hand and wait my turn. Good – see, I can wait!' The children repeated this process, firstly under the adult's instruction and then on their own until they could guide themselves in performing the target behaviour using inner speech.

Practising

The children practised the self-instruction techniques through:

- role-play (e.g. re-enacting classroom scenes to practise self-instruction to guide behaviour);
- pencil and paper tasks (e.g. writing examples of self-instruction); and
- art activities (e.g. drawing themselves engaged in self-instruction).

Cueing

Cue cards were given to the pupils to remind them of the self-instruction they had been taught. The cards reminded the children to:

- inhibit poor behaviour – for example, 'Stop me shouting out';
- initiate target behaviour – for example, 'I need to listen'; and
- reinforce target behaviour – for example, 'Good for me, I concentrated'.

Compared with the children in the control group, the children in the intervention group showed significant improvements in classroom behaviour (as rated by both teachers and independent observers who were unaware of the group allocation) and became more internal in their 'locus-of-control' beliefs. On average, effect sizes ranged from moderate (around 0.5) to substantial (around 0.8). Effects were also sustained at a three-month follow up.

DATA... DATA... DATA... DATA... DATA... DATA... DATA... DATA... DATA...

How to find it How to use it

In recent years demand from schools for clear and accessible data with useful comparative statistics to help inform teaching and planning has grown. And so has the amount of data which is now being made available. Here are some useful examples.

Analysing students' exam performance online

http://www.edexcel.org.uk/questionlevel

From August, teaching staff in Edexcel registered schools and colleges will be able to analyse their candidates' performance in the summer exams at **question level** for the first time, using a new service: Edexcel Online. During the June 2004 examination, Edexcel marked online one million candidates' scripts for 44 question papers. Online marking enables Edexcel to provide a breakdown of all of centres' overall performance question by question rather than at overall paper level only. Teaching staff at Edexcel centres will be able to compare their performance at question level with national averages and also with averages for different types of centres.

How can the information be used?

According to Edexcel, the feedback will allow you to analyse your students' performance in each of the papers and identify candidates' strengths and weaknesses and trends in their performance on particular papers. You will then be able to relate these trends to areas which candidates find easy or difficult to grasp and plan your teaching and learning accordingly in the coming year. The comparisons with national and centre type averages will place your candidates' performance in the context of candidate performance at national level.

DfES - Research and Statistics Gateway

http://www.dfes.gov.uk/rsgateway/

This is a useful and reliable site which allows free access to national school data (in addition to the Autumn Package of data featured in Issue 1 of the Bulletin). You will be able to compare your school's performance with national GCSE and A-Level results, for example. The site allows you to search using keywords or by subject, as well as for specific types of publication. There are also useful links to pages such as "Trends in Education and Skills" and "Key LEA statistics".

Last Word

One for All

Finally, a consortium of organisations has got together to help relieve the burden of data collection for schools and LEAs. Organisations including the DfES, Qualifications and Curriculum Authority, Teacher Training Agency, Learning and Skills Council, General Teaching Council, Ofsted and Becta have signed up to the principle that data should be collected only once and used many times. The aim is to use data effectively to support *individual* pupil learning, *whole* school improvement and *system-wide* capacity building. The data collected would be part of an agreed 'Common Basic Data Set'. The aim is to have these principles implemented by 2006. Find out more here: ***http://www.teachernet.gov.uk/management/tools/ims/datasharingandrationalisation/***

Healthy Data

"Healthier children perform better academically and education plays an important role in promoting health." There's plenty of evidence for repeating this mantra as some of the statistical evidence on page 16 clearly shows. But don't just take our word for it. Check out the data for yourselves:

http://www.wiredforhealth.gov.uk/

The Wired for Health website has a section on health information specifically for teachers. There's also a lot of information that relates to the National Curriculum and the National Healthy School Standard.

http://www.statistics.gov.uk/children/

The Health of Children and Young People site is part of the National Statistics Online website and contains an analysis of health and health-related behaviour among children and young people aged under 20 years in the UK during the period 1990 to 2001. The report brings together statistics from Office of National Statistics (ONS), other government departments and other organisations to provide a comprehensive overview of information on children's health and well-being. There are 12 overviews provided, including diet and nutrition, mental health, disabilities and social inequalities.

Sources of data handling ideas to help teachers and students

Access to data is one thing: knowing what to do with it is another. Here are some starting points for ideas to help teach data handling:

http://www.stats4schools.gov.uk/

Stats4schools aims to help teachers and pupils to get more from statistics. According to Stats4schools, "Statistics paint a picture of who we are, where we live, and what we do. They help people, firms and government make choices which shape our lives".

Managed by the Office for National Statistics (ONS), the site includes free lesson plans, worksheets and datasets, all of which can be downloaded for use in the classroom. The site includes ideas on how to manipulate data and help in using large datasets. It also has a really helpful list of links to other useful websites.

http://www.censusatschool.ntu.ac.uk/

CensusAtSchool is an International Children's Census which provides real data for data handling activities across the curriculum. Established by the Royal Statistical Society, the site is Curriculum Online accredited and aims to promote good use of statistics and data handling. CensusAtSchool links schools in the UK, Canada, New Zealand, South Africa and Australia. Schools can register to get involved and contribute to the census free of charge. They can compare investigations with other schools and other countries. The site contains resources, support materials and teacher worksheets which are free to download.

Hot Websites... from around the world

As the growing number of systematic reviews in education shows, a large proportion of educational research comes from abroad. So for this issue we've picked examples of the different kinds of international sites. Comparing how different countries approach perennial nagging problems helps makes the familiar strange enough to give us a fresh perspective and also makes new approaches familiar enough for us to try them out. They are all in English, so don't worry if you're a monolinguist.

Eurydice - The Information Network on Education in Europe *http://www.eurydice.org/*

The site for education information for Europe, Eurydice is a mine of useful information on educational practice, policy and systems in Europe. It currently covers 31 European countries and the UK arm is based at the National Foundation for Educational Research.

After the homepage, the menu along the bottom of the screen can either be clicked on directly, or hovered over with the mouse to show individual pages throughout the site. The network produces:

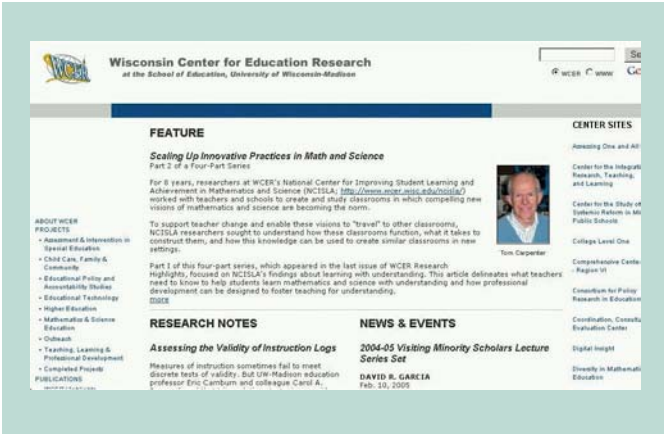
- comparative studies on specific topics of interest to UK teachers, from early childhood education and the teaching of MFL, to the management of schools and higher education;
- regularly updated descriptions on the organisation of each countries' education systems, including thesauri and glossaries for jargon busting;
- indicators and statistics on a variety of topics, from teacher salaries, to ICT use in schools; and
- a small collection of thematic bibliographies, with concise descriptions – so you could look for research about an issue or topic of particular interest.

Eurydice also produces Eurybase, a detailed database of all the educational systems in Europe. The database contains information about ITT, the historical background and the organisation of compulsory and pre- and post- compulsory education, and ongoing debates in the evaluation of education systems in each of the countries covered. England, Northern Ireland and Wales are considered separately from Scotland, and the comparisons are fascinating. They also provide links to educational research sites in the UK.

Publications can be browsed in order of publication date or by subject, so it's easy to search using specific queries when you know exactly what you are looking for, or more general queries about a particular topic. The online formats are very handy for quick navigation, as they include links between sections. However, the large size of some of the files may make them unwieldy for those with slow PCs or connections. Short descriptive summaries of education can be viewed as an alternative to using Eurybase.

The site is kept well up to date. A clickable site map, and effective site search facility are handy but almost superfluous as each education system description contains its own search facility within the document, which can be searched by free text or by keyword, and also links to the glossary.

WCER – Wisconsin Center for Education Research (USA) *http://www.wcer.wisc.edu*



This research and development centre is 40 years old this year. Based at the School of Education, University of Wisconsin-Madison, it is one of the oldest, largest, and most productive education research centres in the world with funding of approximately $25 million annually.

This tidily planned website contains basic information about current and completed projects by the centre, with contact details. Many projects also have their own websites, which are listed with the projects, and also down the right hand side of the homepage for quick access. Current projects include:

- Consortium for Policy Research in Education;
- Diversity in Maths Education;
- Early childcare and After-school care; and
- Testing Accommodations Research – this looks at the delivery of tests, especially for students with disabilities, i.e. using verbal encouragement, reading questions aloud, etc

Many research papers from the centre are available free online, in PDF form. Some are also available in hard copy for a fee. A quarterly newsletter and other summary publications available for some individual projects are a good way of keeping up to date with the centre's activities. However an efficient way of keeping up-to-date is to make the centre come to you. You can do this by signing up to the emailing list for "WCER Today", a monthly research review specifically aimed at educators, administrators, researchers, and policymakers. It's a free service, and takes very little effort on your part. For a sample issue, send an email to pbaker@wisc.edu

Worth a quick dip?

Institute for Educational Research – University of Jyvaskyla, Finland *http://www.jyu.fi/ktl/introduction/*

Many people think that the Finnish education system is one of the most successful in the world and much of the country's educational research is available in English. The Institute actually works separately from the University of Jyväskylä, so you don't necessarily have to learn how to say it. The IER's strongest area is national and international assessment and evaluation of education. It covers a broad range of fields of study so the chances are you'll find evidence there which is relevant to your work and to your interests.

Australian Council for Educational Research (ACER) *http://www.acer.edu.au/*

ACER carries out research in a wide range of educational topic areas and many of their publications are available for downloading in PDF form – though if you want printed copies you would have to buy them.

Healthy, wealthy and wise

How much do we need to know (or care) about the health of the students for whose learning we are responsible? Why do twice as many 15 year old girls smoke than boys? What makes young people in the UK get drunk so much more often than their peers in France and Italy? And, for goodness sake, why do girls visit the dentist so much less frequently than boys?

Schools and colleges can't put all the worlds' wrongs to right. But if the old adage - *mens sana in corpore sano* – is to be believed, healthy minds coexist with healthy bodies and it helps to know what sort of trends we are looking at. The statistics may present few surprises for some, but they certainly raised some eyebrows in the Bulletin's editorial department!

Drinking is on the up

30% of British 15-16 year olds said they had been drunk at least twenty times in their life - compared with 4% of French youngsters and 2% of Italians at the same age. And the proportion of young men (16-24) drinking more than 21 units of alcohol a week went up from 33% in 1997 to 42% in 2002. For young women, this increased from 22% to 32%. (Whew. Does this mean that some of the behavioural issues in our classrooms are caused by hangovers?)

Supersizing is on the up

More than a fifth of English boys and over a quarter of girls are obese.

In 2002 the number of obese boys was double the number in 1995.

Is this where we're heading?

The number of USA deaths caused by poor diet and lack of exercise in 2000 was 400,000, an increase since 1990 of 33%. The proportion of US adults overweight or obese is 66%.

How do they do it?

The national average of pupils cycling to school is 2%. But between 1995 and 1998 the percentage of Kesgrave High School's 1,400 pupils cycling to school went up from 45% to 61%. ***http://www.kesgrave.suffolk.sch.uk/schoolinformation/travel.html***

British Early Bird Study reported in ***American Diabetes Association 64th Annual Scientific Sessions*** ***www.diabetes.org***

Overweight Children - Prevention and Treatment ***http://pediatrics.about.com/*** *Sproston K and Primatesta P (eds) Health Survey for England 2002. Volume 1: The health of children and young people. The Stationery Office, London, 2003.*

About this publication

The Bulletin has been produced for teachers, lecturers and all the professionals who support learning, wherever it takes place. It is a pioneering publication in the field of education, which aims to bring research evidence to the attention of practitioners to help them directly in their work. It does this by identifying matters of practical concern and selecting reliable research that addresses them.

Further copies are available free of charge by emailing nerf@prolog.uk.com, writing to **NERF publications, PO Box 5050, Sherwood Park, Annesley, Nottingham, NG15 0DJ**, or phoning **0845 6022260**. Please quote reference code **NERFB2**.

A PDF of Issues 1 and 2 of the Bulletin can be downloaded from ***www.nerf-uk.org/bulletin***

This is the second pilot issue of the Bulletin. We hope to be able to bring you Issue 3 in the spring term. Meanwhile, please let us know what you think by emailing ***info@nerf-uk.org***: what topics would you like to see in the next issue? How can we improve the Bulletin?

The Bulletin is produced by the Centre for the Use of Research and Evidence in Education (CUREE) on behalf of NERF. The CUREE team is: Philippa Cordingley, Director; Miranda Bell, Editor; Zenobia Daar, Coordinator; Caroline Page, cartoons. Design and layout by Noel Stainer, DfES.

NERF

National Educational Research Forum

The National Educational Research Forum is an independent body with a remit to oversee the developmentof a national strategy and framework for educational research in England.

innovation

The DfES Innovation Unit acts as a catalyst for change in the school system. We do this by bridging policy and practice to create an arena in which all parties can develop innovative responses to the learning challenges facing the education sector. Keep in touch via our website ***www.standards.dfes.gov.uk/innovation-unit*** and join our lively online neighbourhood. We look forward to welcoming you.

department for
education and skills
creating opportunity, releasing potential, achieving excellence