

What improves pupil achievement?

Ben Goldacre is a doctor and academic who writes about problems in science and evidence based policy in his Guardian column, "Bad Science". His paper *Building Evidence into Education*, sets out his view that education needs to collect evidence about what works best and establish a culture where this evidence is used as a matter of routine to improve outcomes for children. Goldacre believes this would set the profession free from the impulses arising from governments and other educational stakeholders, who continually distribute new ideas for implementation that lack quality evidence on their effectiveness.

Goldacre believes that *randomised trials* are the most reliable tool for locating evidence on the interventions that works best, although he recognises that this has problems as although randomised trials are good at showing that something works, they're not so helpful for understanding *why* it worked. This may mean that the success may well be associated with factors relating to the specific pupil cohort rather than the intervention.

In schools, teachers need to be empowered to provide the best interventions for all pupils, instead of feeling under pressure to follow the guidance and statutes laid down by whatever agency is in power. This article is about encouraging schools to identify and put in place research based interventions that have a record of bringing about change for pupils, including for those who have the most barriers to learning.

The Evidence Based Teachers Network (EBTN)

The EBTN is open to anyone in the teaching profession interested in using evidence based methods either in their classroom or as a strategy for improving learning in their school or college. It places a focus upon evidence-based teaching, which requires consistent standards of evidence to be available before a teaching method is used. In reality, at present, a great deal of practice and guidance in education is not evidence based. This need to change is recognised but is not simple as many of those who follow this path soon discover that much research is contradictory. To overcome this, some researchers produce systematic research reviews, sometimes called meta-studies. These have agreed criteria and methods for searching for papers, books etc and also for allowing or disallowing such sources into the review. The best known of these meta-studies is that undertaken by John Hattie from New Zealand, in his publications *Visible Learning* (2009), and *Visible Learning for Teachers: Maximising impact on Learning* (2012)

Professor John Hattie

Professor John Hattie collated the impact on pupil achievement of more than half a million of the most effective research studies on teaching methods and the other variables that affect achievement. It is the biggest and most authoritative review of classroom-based educational research ever undertaken. It concludes that the sources of variance in student's achievement result from:

- **Students themselves;** this accounts for about 50% of the variance of achievement. The skills and attributes that students possess predict achievement more than any other single variable.
- **Home;** this accounts for about 5-10% of the variance and is often linked to the levels of expectation and encouragement students receive from their parents or caregivers.
- **Schools;** this accounts for about 5-10% of the variance – a similar proportion to the influence variance from home. School buildings, leaders, organisation etc barely make a difference to achievement.
- **Peer influence;** this also account for about 5-10% of the variance.
- **Teachers;** teachers account for about 30% of the variance. It is what teachers know, do, and care about which is very powerful in this learning equation and has the most impact after the attributes and skills possessed by the student themselves.

His meta study identifies the teacher characteristics that make the most impact as including:

- Teachers taking responsibility; don't blame the pupils;
- Teachers as agents of change more than facilitators;
- Teachers gaining feedback about their own effectiveness and progress;
- Teachers who provide challenge that is more than "do your best";
- Teachers who welcome error and build trust among peers in classrooms;
- Teachers who see assessment as informing them more than informing pupils;
- Teachers as evaluators (of themselves more than of pupils).

Hattie identified that almost **all** things schools do in the name of education have a positive effect on achievement but since the **average effect size of impact** is 0.4, EBTN suggests that interventions with an effect size greater than 0.5 should be used first, as these will have the greatest effect on learning. The Hattie meta-study identified that features that impacted upon the rate of learning included:

- Acceleration (speed up a year) .88
- Feedback .73
- Student-teacher relationships .72
- Teaching study skills .59
- Reading Recovery .50
- Cooperative learning .41
- Homework .29
- Individualised instruction .22
- Ability grouping .12
- Open vs. traditional classes .01
- Retention (hold back a year) -.16
- Shifting schools -.34

The conclusion from the meta study was that students need to be effectively supported to:

- Understand learning intentions;
- Be challenged by success criteria;
- Develop a range of learning strategies;
- Know when they are not progressing;
- Seek feedback;
- Visibly teach themselves.

Professor Robert J. Marzano

Professor Robert J. Marzano working with other researchers in the USA, identified nine instructional strategies that they judged were the most likely to improve student achievement across all content areas and across all grade levels. These are explained in the book *Classroom Instruction That Works* by Robert Marzano, Debra Pickering, and Jane Pollock and include:

1. Identifying similarities and differences;
2. Summarising and note taking;
3. Reinforcing effort and providing recognition;
4. Homework and practice;
5. Non-linguistic representations;
6. Cooperative learning;
7. Setting objectives and providing feedback;
8. Generating and testing hypotheses;
9. Cues, questions and advance organisers.

Geoff Petty

Geoff Petty is author of a number of publications aimed at increasing evidence based teaching to improve outcomes for pupils. He suggests there are two ways to increase the impact teaching can have on outcomes:

1) Using self-assessment to audit personal teaching strengths and weaknesses and to work on these. Petty's website allows access to useful tools to support teachers with this. These include a self-assessment grid that encourages teachers to reflect upon a variety of standards for excellence e.g. goals and purpose, planning, content and presentation, atmosphere and relationships, the student experience, resources and achievement of objectives. In addition there are teacher and student questions and a proforma to support reflection.

2) Identifying the main factors that make the biggest difference to student learning (the focus of this website). Research that supports the John Hattie findings, indicates that these include:

- Active Learning - set students challenging activities so they apply and check their learning.
- Feedback - learners need information on what they do well and how to improve; then they need to act on this. Teachers can give feedback but students can too with self-assessment and peer assessment. The best feedback (or formative assessment) uses student's work to diagnose strengths and weaknesses and to set individual targets for improvement.

Resources

Sutton Trust-EEF Teaching and Learning Toolkit

The Sutton Trust-EEF Teaching and Learning Toolkit was originally produced as the '*Pupil Premium Toolkit*' by Durham University in May 2011 by Professor Steve Higgins et al. It aims to be an accessible summary of educational research that provides guidance for teachers on action they can instigate to improve the attainment of disadvantaged pupils. The Toolkit examines thirty different aspects and provides a summary of their average impact on attainment, the strength of the evidence supporting them and their cost. The findings suggest that the additional impact the interventions contribute to learning success were:

- Feedback (8 mths)
- Metacognition and self-regulation (8 mths)
- Peer tutoring (6 mths)
- Early Years interventions (6 mths)
- One to one tuition (5 mths)
- Homework (secondary) (5 mths)
- Collaborative learning (4 mths)
- Phonics (4 mths)
- Small group tuition (4 mths)
- Behaviour interventions (4 mths)
- Digital technology (4 mths)
- Social and emotional aspects of learning (4 mths)
- Parental involvement (3 mths)
- Reducing class size (3 mths)
- Summer schools (3 mths)
- Sports participation (2 mths)
- Arts participation (2 mths)
- Extended school time (2 mths)
- Individualised instruction (2 mths)
- After school programmes Learning styles (2 mths)
- Mentoring (2 mths)
- Homework (primary) (1 mths)

- Teaching assistants (0 mths)
 - Performance pay (0 mths)
 - Aspiration interventions (0 mths)
 - Block scheduling (0 mths)
 - School Uniform (0 mths)
 - Physical environment (0 mths)
 - Ability grouping (-1 mths)
- <http://educationendowmentfoundation.org.uk/toolkit/>

Institute for Effective Education

The IEE based at the University of York conducts rigorous evaluations of education programmes and practice and its website allows access to up to date information in this field. Of particular note is the access to the speakers' presentations at the recent IEE Conference (March 2013) <http://www.york.ac.uk/iee/index.htm>

Further information

John Hattie

A PowerPoint presentation where John Hattie explains Visible Learning is located at <http://preview.tinyurl.com/yefkcxv>

Teachers make a difference John Hattie (2003) <http://preview.tinyurl.com/le9ja9>

Two YouTube 15 minute clips provide edited highlights of a presentation given by John Hattie on his research.

- Part 1 Disasters and below average methods
<http://www.youtube.com/watch?v=sng4p3Vsu7Y>
- Part 2 Effective methods <http://www.youtube.com/watch?v=3pD1DFTNQf4>

Ben Goldacre

Building Evidence into Education written by Ben Goldacre (2013) is accessible via the DfE website <http://preview.tinyurl.com/ceag6pz>

Test, Learn, Adapt published in collaboration with Ben Goldacre and David Torgerson, sets out the argument for using Randomised Controlled Trials in public policy.

<http://preview.tinyurl.com/arnwevz>

Analytical review DfE April 2013. Conducted by Ben Goldacre and Roger Plant – this review was commissioned by the Secretary of State and looks at the role of research, analysis and data in the Department for Education, schools in England and children's services.

<https://www.gov.uk/government/publications/department-for-education-analytical-review>

Robert Marzano

An overview of the findings from Prof Robert Marzano's book *Classroom Instruction that Works* can be found here <http://preview.tinyurl.com/d3xxgey>

Geof Petty

Geof Petty's self assessment tool and a great deal more information on evidence based teaching can be found on his website <http://www.geoffpetty.com/>

Mike Bell

Evidence based teachers network A valuable website managed by Mike Bell that is invaluable when looking for advice and guidance on the application of evidenced teaching <http://www.ebtn.org.uk/>

Mike Bell describes *The case for evidence based teaching* in this 15 minute video clip.

<http://www.evidencebasedteaching.co.uk/free.html>

The Sutton Trust EEF Teaching and Learning toolkit

<http://educationendowmentfoundation.org.uk/toolkit/>

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