



NSW INSTITUTE  
OF TEACHERS



## Teacher effects

# How real are they?

### INSIDE

Teacher effects: How real are they?

Brian Byrne

1

Teacher effects: What makes a difference to student achievement?

Steve Dinham

4

The *Spray* is produced by the Australian Council for Educational Research for the NSW Institute of Teachers alongside *The Digest* and *The Knowledge* in a suite of electronic publications issued exclusively by the NSW Institute of Teachers to accredited teachers.

Each edition of *The Spray* presents the views of two commentators addressing a single topic of relevance to education in New South Wales.

Editor **Steve Holden**, ACER, Press.

The views expressed in this publication do not represent the views or policies of the NSW Institute of Teachers.

The *Spray* is available in HTML and PDF versions on the NSW Institute of Teachers website at: [www.nswteachers.nsw.edu.au](http://www.nswteachers.nsw.edu.au)

*While research indicates that teachers make a difference to student achievement, Brian Byrne says new research using twins indicates that when it comes to teacher effects, the differences are not very large.*

There is no doubt that teachers make a difference. Children know more at the end of a school year than at the start because of the work of teachers. Often enough, they know more at the end of a day than at its start because of the work of teachers. There's another sense in which people think of 'teacher effects,' though, and that is the relative

influence of different teachers on children's progress.

Consider two children in different classes in the same school year, studying the same subject, with the same native ability, and from the same kind of home background. Could one learn more during the year than the other because of the quality of teaching? To many people, the answer is

blindingly obvious. Of course. Certainly, sections of the press and some politicians think so. Here's Jonathan Alter, from *Newsweek* in 2007: 'Anyone with an ounce of brains knows what must be done,' namely, 'move from identifying failing schools to identifying failing teachers.' And here's John Della Bosca, when he was New South Wales Minister for Education in 2008, quoted by the

## 2 Teacher effects

*Sydney Morning Herald's* Anna Patty: 'Studies claim that 40 per cent of the variation in student performance is the result of teacher quality.'

Proving the 'obvious' has not, however, been easy.

It may seem that all that needs to be done is to show that the average level of class achievement differs from teacher to teacher, but there may be a higher level of average native ability in one class; there may be an assignment of lower-achieving children to a particular teacher because of a seniority system; class sizes may vary and that could make a difference.

There are methods to address some of these concerns, such as being interested not in the absolute level of a child's achievement but in how much his or her achievement improved, or worsened, compared to the previous year as a result of being in a particular teacher's class. Together, methods with this feature are referred to as value-added models, but even these aren't foolproof when used to identify teacher effects. To take just one example, improvement in one year may be a delayed effect of the previous year's teacher, such as when that teacher is successful in encouraging a child to read

profusely over the summer, which is known to boost children's reading.

At the end of a lengthy review of the available evidence on value-added models by the Rand Corporation, Daniel McCaffrey and colleagues concluded that 'the research base is currently insufficient to support the use of (value-added models) for high-stakes decisions. We have identified numerous possible sources of error in teacher effects and any attempt to use (value-added modelling)

Even if we assume that the classroom effect that does exist... is due to teachers and not to other processes going on in classrooms, it's not as large as many people think.

estimates for high-stakes decisions must be informed by these potential errors.'

In view of the uncertainties about teacher effects, new data sources are valuable. Our research group has developed a novel method of measuring the differential effects of teachers. More strictly, we should say differential classroom effects,

because while teachers may be the source of genuine differences among class-level indicators of performance, other factors, such as the climate of the classroom – for example, the overall attitude of the students in a class to the value of learning – can and do influence average performance. Whether such differential classroom effects are due to the teacher or something else, the degree to which such effects exist can be gauged by the relative performance of twin children, according to whether they

have the same or different teachers.

Consider identical twins; they share the same native ability, they come from the same household, and they attend the same school. We know already that they will perform at pretty similar levels on many school subjects, in fact more similarly than non-identical twins, which

constitutes the primary evidence for an influence of genetic endowment on school performance.

That aside, if teachers make a substantial difference to how successfully children learn, then identical twins who share the same teacher as each other should be even more similar than those who have different teachers from each other.

We've had the opportunity to examine this situation for twin children learning to be literate in the first three years of school, with large samples from Australia and the United States. That research will be published in the *Journal of Educational Psychology*.

What have we found? Averaged across many tests of literacy, three school years, and two countries, identical twins sharing teachers correlated .82 while those with different teachers correlated .75. The respective values for nonidentical twins were .54 and .46, lower overall than for identical twins – the evidence for the influence of genes on literacy – but a difference of about the same magnitude in the same direction. These values are the sort you would expect if teachers 'make a difference' in this relative way, but the differences are not very large, not the

magnitude you would expect if 40 per cent of the variance in children's reading and spelling could be attributed to teachers.

As a matter of fact, you would expect a difference of .40, so that the identical twin children with different teachers should present with a correlation of .42 compared with the .82 for children with the same teacher.

Even if we assume that the classroom effect that does exist – .82 for identical twins sharing teachers and .75 for identical twins with different teachers – is due to teachers and not to other processes going on in classrooms, it's not as large as many people think. If classroom processes other than teacher effectiveness are also part of the story, teacher effects are even smaller.

We're not saying they are trivial, since any change, up or down, in a child's literacy levels for whatever reason has downstream effects on other school subjects, indeed on many aspects of life, and of course, individual teachers' exemplary contributions can be masked by averaging data across whole school systems, as we are doing here. On the whole, though, it seems that teachers in our survey are more equal than unequal

in effectiveness as they lead children through the vital steps of becoming literate.

Furthermore, teachers are not only fairly equally effective, but judging by international comparisons, they're pretty effective at that. Australia scores above the Organisation for Economic Cooperation and Development (OECD) average in literacy, according to the OECD Program for International Student Assessment (PISA).

Consistent with the data I've just presented, in our research we've failed to detect much in the way of what's called a 'shared environment' effect. This effect captures the influence of aspects of their environments that twin children share, and in our study they almost always share the school as well as sometimes sharing a teacher. So differential school effects, as well as teacher effects, are not substantial.

Some people consider that you can't use studies of twin children to learn about children in general because, for instance, family pressure keeps twins at the same level if they begin to diverge in ability. In this way, studies based on twins may underestimate classroom effects.

Apart from the fact that twins are sometimes competitive rather than cooperative, however, the absence of shared environment effects in our data is inconsistent with this suspicion, which is why we're confident that we have identified genuine but small effects of different classrooms on early literacy, smaller than one would want and of less certain origin than one would want if high-stakes decisions are to be based on them.

If I might venture into speculation, it strikes me as curious that almost alone among the professions, teaching comes in for such sustained media attention, often negative, with calls for across-the-board and individual improvements being a common feature of this attention.

Improvements are to be welcomed, of course, and nothing in our data suggests they are not possible or advisable, but why not also in medicine, mining engineering, architecture?

Our evidence, when combined with data from studies like PISA, suggests that, at least as far as early literacy is concerned, we have an internationally competitive and in large measure an equally competent set of teachers.

## References

Alter, J. (2007). *Stop pandering on education*. Newsweek (12 February). Available at [www.newsweek.com/id/42974](http://www.newsweek.com/id/42974)

McCaffrey, D.F., Lockwood, J.R., Koretz, D.M. & Hamilton, L.S. (2003). *Evaluating value-added models for teacher accountability*. Santa Monica, CA: Rand Corporation.

Patty, A. (2008). *Ministers agree on merit pay for teachers*. Sydney Morning Herald (18 April). Available at [www.smh.com.au/news/national/ministers-agree-on-merit-pay-for-teachers/2008/04/17/1208025389588.html](http://www.smh.com.au/news/national/ministers-agree-on-merit-pay-for-teachers/2008/04/17/1208025389588.html)

*Brian Byrne is Professor of Psychology at the University of New England. He directs the international longitudinal study of twin children as they develop in language and literacy, from which the results in this article are drawn, with funding from the Australian Research Council and the National Institutes of Health. The Australian twins were recruited via the Australian Twin Registry, funded by the National Health and Medical Research Council, and the Australian Multiple Birth Association. For information on representative publications, visit [www.une.edu.au/staff/bbyrne.php](http://www.une.edu.au/staff/bbyrne.php)*



## Teacher effects

# What makes a difference to student achievement?

*Research shows that good teaching and good schools can help overcome the effects of socioeconomic disadvantage, as Stephen Dinham explains.*

Until the mid-1960s the prevailing view was that schools make almost no difference to student achievement, which, so it was thought, was largely determined by socioeconomic status (SES), family circumstances and innate ability. James Coleman's 1966 *Equality of Educational Opportunity* report was very influential in reinforcing this view.

Measured 'IQ' was considered a powerful predictor of student achievement and seen as largely innate and fixed by the time young people entered school. In other words, every student had his or her personal glass ceiling when it came to educational attainment. More than that, whole schools, suburbs, cultural groups and even regions were consigned to a particular category within society, with

expectations for achievement and probable employment adjusted accordingly.

Despite exceptions, such self-fulfilling prophecies came true for many young people, in part because the potential value and values of 'equity' and 'comprehensive' schooling had yet to be fully recognised; with students 'streamed' into either the trades or professions due to the type of school they attended.

We now know from decades of research that teachers, teaching and schools do

make a significant difference to student success. We know that the classroom teacher is the biggest in-school influence on student achievement and that prior achievement also exerts a powerful influence. For more on this, see the work of Robert Marzano, Debra Pickering and Jane Pollock, the work of John Hattie, and my own work with Lawrence Ingvarson and Elizabeth Kleinhenz.

We know how teacher expertise develops and we know what good teaching and good schools look like. We also know, however, that teacher quality varies significantly within and between schools and across the nation. As a result, there has been a major international emphasis on improving the quality of teachers and teaching since the 1980s.

As Paul Wright, Sandra Horn, and William Sanders put it, in 'Teacher and classroom context effects on student achievement,' 'the most important factor affecting student learning is the teacher.... The immediate and clear implication of this finding is that seemingly more can be done to improve education by improving the effectiveness of teachers than by any other single factor.'

Research has also demonstrated, however, that SES also has a moderate to large effect on student achievement.

A key fact to note is that SES and its effects are not unidimensional. SES is about: foundations and advantage for school and life success; opportunity; support; role models, encouragement and expectations. SES isn't about: innate ability; social-biological determinism; or potential.

While there is a relationship between SES and student achievement, international measures such as the Program for International Student Assessment of the Organisation for Economic Cooperation and Development demonstrate that poor student performance is spread across the SES spectrum in Australia and elsewhere.

The harsh reality is that schooling represents an obstacle course and not all students commence from the same starting line. Some students have certain advantages and others encounter severe obstacles.

Following his analysis of an extensive array of international studies, John Hattie concluded there is 'a remarkable difference in what students bring to school.' As he puts it in *Visible Learning*, 'The lack of resources, the

lower levels of involvement in teaching and schooling, the lesser facilities to realise higher expectations and encouragement, and the lack of knowledge about the language of learning may mean that students from lower-SES groups start the schooling process behind others.'

It is for this reason that so much attention is now being paid to early childhood education in Australia – achievement gaps are already wide on entry to school and will widen over time for some students, especially in literacy, the foundation of schooling.

Writing recently, in the *Educational Researcher*, Stephen Raudenbush eloquently and powerfully addressed the related issues of SES, quality of teaching and life chances for students. 'School improvement by itself has potential to make an enormous difference in the lives of children even if broader social change is slow in coming,' Raudenbush observed. 'The children who depend most on good schooling for academic growth are the least likely to receive it. If school improvement begins early in life and is sustained, the most disadvantaged children stand to benefit most. This reasoning suggests that increasing the amount and

the quality of schooling to which these children have access would reduce inequality in academic achievement.'

A key to overcoming the effects of socioeconomic disadvantage is to enhance communication and understanding between the school, home and community. Successful schools from low-SES areas characteristically have bridged the cultural, language and educational attainment divides between school and home through the use of measures such as 'home-school liaison' workers; multilingual communications and the use of interpreters; acknowledging, respecting and accepting cultural differences; and taking the school to the community in various ways.

In 2007, the late Ken Rowe and I conducted a review of middle schooling research evidence for the New Zealand Ministry of Education. One of our key findings was, 'There is strong evidence indicating that the quality of teaching which students receive at all levels and stages of schooling is of major importance in influencing student achievement outcomes. In fact, the effects of quality of teaching far outweigh factors associated with students' family socioeconomic and social-cultural backgrounds.'

In New Zealand, like Australia, there are concerns over the academic performance of Indigenous students, in this case, Maori and Pacifica, who tend to come from lower-SES backgrounds. Rather than being attributable to some form of social-biological determinism, however, we found that, 'The low academic performance of some Maori and Pacifica students in the middle years... (is more attributable to) lower academic expectations and insufficient engagement by teachers with Maori and Pacifica students and their cultural contexts.... It is important to note that there can be wide variation in student achievement in schools with predominantly Maori and Pacifica students. This is largely explained by variation in teaching quality at the class level, rather than students' sociocultural backgrounds.'

Consistent findings from the evidence-based research literature relating to the relative impact of teaching and schools in accounting for variance in student achievement outcomes suggests that the variation between class or teacher groups within schools is notably greater than the variation between schools. Thus, even with schools which are relatively homogeneous in terms

## 6 Teacher effects

of the SES and cultural backgrounds of students and the community, student achievement varies just as it does within any school.

A key question then, is this: where ought we to focus interventions to address student and school under-achievement? Douglas Willms has identified two policy implications flowing from answers to that question:

'First, school reforms should focus on within-school interventions for all schools, rather than whole-school reforms targeted at low-performing schools. Second, within-school interventions should not focus particularly on children from low-SES families; rather, there should be universal interventions aimed at improving results for all students, or performance interventions targeted towards those with low levels of academic performance.'

SES does have a moderate to large effect on student achievement, but it isn't nor should it be construed as a 'life sentence.' Ken Rowe and I concluded from our review that what matter most is, 'not student compositional characteristics such as *learning difficulties, educational disadvantage, disruptive student behaviours*, nor school structural arrangements.,, but the imperative of *quality teaching and learning*

*provision, supported by teaching standards and ongoing teacher professional development focused on evidence-based practices that are demonstrably effective in maximising students' learning outcomes and achievement progress.'*

Yes, life is not fair, but the important message is that *good teaching and good schools can help overcome the effects of SES disadvantage.* Many people reading this, like myself, came from a lower-SES background and obtained a tertiary education and became a teacher because of the opportunities that school education provided.

By all means, we *should* pay attention to pockets of academic under-performance, including low-SES schools and students of low-SES backgrounds, and we should try to ensure that all schools are adequately resourced and well maintained, but we also need to focus on all students as learners and people. A quality teacher in every classroom is the biggest equity issue in Australian education today. We need to do what is necessary to ensure that every Australian student has the opportunity to experience a quality education. This is the best chance we have of reducing the effects of SES disadvantage.

### References

- Coleman, J.S. (1966). *Equality of Educational Opportunity*. Boulder, CO: Westview Press.
- Dinham, S., Ingvarson, L. & Kleinhenz, E. (2008). *Investing in teacher quality: Doing what matters most*, in *Teaching Talent: The best teachers for Australia's classrooms*. Melbourne: Business Council of Australia. Available at: <http://www.bca.com.au/Content/99520.aspx>
- Dinham, S. & Rowe, K. (2007). *Teaching and Learning in Middle Schooling A review of the literature - A Report to the New Zealand Ministry of Education*. Melbourne: ACER. Available at: [www.educationcounts.govt.nz/\\_data/assets/pdf\\_file/0006/36717/913a\\_ACER\\_Middle\\_Schooling\\_Lit\\_Review.pdf](http://www.educationcounts.govt.nz/_data/assets/pdf_file/0006/36717/913a_ACER_Middle_Schooling_Lit_Review.pdf)
- Hattie, J. (2009). *Visible Learning*. London: Routledge.
- Marzano, R., Pickering, D. & Pollock, J. (2005). *Classroom Instruction that Works: Research-based strategies for increasing student achievement*. Upper Saddle River, NJ: Pearson.
- Raudenbush, S. (2009). *The Brown legacy and the O'Connor challenge: Transforming schools in the images of children's potential*. *Educational Researcher*. 38(3): 169-180.
- Willms, J.D. (2007). *Variance within and among classrooms and schools: The case of New Zealand*. Paper prepared for the Iterative Best Evidence Synthesis Program. Wellington: New Zealand Ministry of Education.
- Wright, S., Horn, S. & Sanders, W. (1997). *Teacher and classroom context effects on student achievement: Implications for teacher evaluation*. *Journal of Personnel Evaluation in Education*. 11: 57-67.
- Professor Stephen Dinham** is Research Director of Teaching, Learning and Leadership at the Australian Council for Educational Research. His latest book is *How to Get Your School Moving and Improving: An evidence-based approach*, published by ACER Press. ISBN 9 780 864 319 319. RRP \$39.95