

CMRE Research Digest 2014-09 (5)

Editor: Gabriel Heller Sahlgren

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Editor's Pick

Teacher Practices and Cognitive Skills

By: Jan Bietenback

Labour Economics (in press)

Published version:

<http://www.sciencedirect.com/science/article/pii/S0927537114000219>

Working paper version (free): <http://www.sole-jole.org/13357.pdf>

One of the most hotly debated topics in education today concerns the gradual decline of traditional teaching methods, such as lecturing, in favour of more pupil-centred methods, which focus more on group work/discussion. These methods, which have been introduced under different names by different reform movements, are supposed to prepare pupils for a shifting labour market in which reasoning skills are becoming more important. Indeed, pupil-centred methods are today preferred by many educational organisations.

Yet it is clear that the evidence base for these methods has been meagre at best. The first issue of this research digest discussed a study that found that test scores, both national and international, declined significantly in Quebec as a result of the province's introduction of pupil-centred methods en masse. This is not an isolated finding: other research has also found that traditional teaching methods are preferable if we are interested in raising test scores.

Of course, this evidence only shows that pupil-centred methods may be harmful, at least in comparison to superior teacher-centred methods, for the type of skills covered by the tests. Interestingly, while teaching methods have changed, the content of most tests has not. It could be the case that traditional teaching methods are good for increasing scores in traditional tests, whereas modern teaching practices are better for other types of skills that are not measured by those tests. One of the key rationales for utilising pupil-centred methods is indeed to promote reasoning skills over factual knowledge and basic problem-solving skills – but most tests focus on the latter.

In a new paper, economist Jan Bietenback finds evidence the above holds true. The author analyses TIMSS test scores in mathematics and science among American eighth graders in 2007. By decomposing scores in three different domains, he is able to separate the effects of different teaching practices on 'knowing', 'applying', and 'reasoning' domains, with the weight being about 35%, 41%, and 24% respectively in mathematics, and 37%, 41%, and 22% respectively in science. Importantly, it is the last domain that measures skills that many advocates of modern teaching practices seek to promote.

The author analyses how differences in teaching methods that pupils experience in science and mathematics are related to test-score differences in these subjects, which means that he can hold constant unobservable pupil characteristics, such as intelligence, maturity etc., that affect their results equally in science and mathematics.

Interestingly, he finds that traditional teaching methods are clearly best for raising achievement in the two 'traditional knowledge' domains: a 100% increase in traditional teaching methods raises achievement in those domains by fully 0.42 standard deviation in the 'knowing' domain, and by 0.36 standard deviations in the 'applying' domain. However, modern teaching practices are best for raising achievement in the 'reasoning' domain: a 100% increase in modern teaching practices increases achievement by 0.24 standard deviations in this domain. While the differences are only statistically significant in the first two domains, this indicates that the different teaching practices are good for different things. The author also analyses data from 16 education systems pooled, and finds very similar effects, with the differences now being statistically significant also in the reasoning domain.

It should be noted that the research methods utilised are unable to control for all potential bias. For example, unobserved teacher traits could correlate with the choice of teacher method and domain focus in the classroom. If this is the case, and the unobserved teacher trait affects pupil performance, the results are biased.

While more research clearly is needed before we draw too strong conclusions, these are nevertheless important findings. First, they point to a potentially disturbing trade-off between different types of knowledge and skills. While reasoning skills may increase with modern teaching practices, traditional skills may be reduced significantly at the same time. Second, it indicates that an important reason modern teaching methods often fail to raise test scores is simply that their performance are measured by results in traditional tests. For example, only about 20-25% of the questions in TIMSS focus on such reasoning skills. If tests were devised differently, therefore, results may differ.¹

In general, given the trade-off, it is difficult to draw clear policy conclusions – it depends on what type of knowledge and skills we are mostly interested in promoting. While reasoning skills are likely to grow in importance for success in the labour market, one could also argue that traditional skills will remain key for many jobs. For example, a thorough understanding and knowledge of algebra is important for further education in mathematically intensive subjects and vocations at the university level, such as engineering and computer science, which are often emphasised as crucial for countries' prosperity. Future work

¹ On the other hand, results reported in the first issue of this year's research digest indicate that traditional teaching methods are also preferable for raising PISA test scores, which are supposed to focus more on reasoning skills than traditional skills.

should study the link between different test score domains and teaching practices with earnings in order to investigate this further.

It is therefore far from clear that traditional skills should be abandoned wholesale. The first step must be to determine what skills and knowledge we want to promote. In this process, competition is likely to play an important part – strong school autonomy in teaching practices and curricula, in combination with more school choice, is a way to spur that competition. In combination with a rigorous research programme to study the effects in the labour market, such an approach is likely to generate a much better understanding of these issues.

Effects of Policy and Practice – Developed World

Classroom Grade Composition and Pupil Achievement

By: Edwin Leuven and Marte Rønning

Economic Journal (accepted article)

Published version:

<http://onlinelibrary.wiley.com/doi/10.1111/eoj.12177/abstract>

Working paper version (free): <http://www.ssb.no/publikasjoner/pdf/dp722.pdf>

This paper exploits discontinuous grade mixing rules in Norwegian junior high schools to estimate how classroom grade composition affects pupil achievement. Pupils in mixed grade classrooms are found to outperform pupils in single grade classrooms. This finding is driven by pupils benefiting from sharing the classroom with more mature peers from higher grades. The presence of lower grade peers is detrimental for achievement. Pupils can therefore benefit from de-tracking by grade, but the effects depend crucially on how the classroom is balanced in terms of lower and higher grades. These results reconcile the contradictory findings in the literature.

Choice of Ontario High Schools and its Impact on University Applications

By: Philip S. J. Leonard

Education Economics (in press)

Published version:

<http://www.tandfonline.com/doi/full/10.1080/09645292.2013.856869#.VCk22efShDw>

Working paper version (free):

http://sociology.uwo.ca/cluster/en/projects/docs/km_projects/2011/stats_can_high_school_choice.pdf

The extent to which increasing students' ability to choose between schools can impact their educational outcomes continues to generate significant research interest. The author takes advantage of the unique context in the province of Ontario, where two publicly funded school systems operate in parallel. I find a small positive impact of school choice on student applications to university. However, most of the impact is in terms of 'cross-effects'; the most robust finding is that the more Catholic high schools accessible from a neighbourhood, the better the public high schools perform. This is suggestive that one mechanism through which choice affects school outcomes is through competition between public and Catholic school boards.

School Entry Age and Children's Social-Behavioural Skills: Evidence From a National Longitudinal Study of US Kindergartners

By: Ashlesha Datar and Michael Gottfried

Educational Evaluation and Policy Analysis (in press)

Published version:

<http://epa.sagepub.com/content/early/2014/09/10/0162373714547268.abstract>

Working paper version (free):

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2354649

Prior research evaluating school entry age effects has largely overlooked the effects on social-behavioural skills despite the growing recognition of returns to such skills. This study is the first to examine the effects of kindergarten entry age on children's social-behavioural outcomes using 9 years of panel data on a national sample of US children. The authors leverage exogenous variation in birth dates and kindergarten entrance age policies to estimate instrumental variables models. The results show that entering kindergarten a year later is associated with significantly better social-behavioural outcomes during elementary school. However, these effects largely disappear by the end of middle school. Larger gains over time among younger entrants support the notion that the estimated effects are age-at-test effects.

Teachers without Borders: Consequences of Teacher Labour Force Mobility

By: Kevin C. Bastian and Gary T. Henry

Educational Evaluation and Policy Analysis (in press)

Published version:

<http://epa.sagepub.com/content/early/2014/06/05/0162373714535662.abstract>

Working paper version (free): <http://publicpolicy.unc.edu/files/2014/02/Out-of-State-WP-2013.pdf>

Many American states have responded to teacher shortages by granting certification to individuals traditionally prepared out-of-state; now, out-of-state prepared teachers comprise a sizable percentage of the teacher workforce in many states. Little is known about these teachers, and therefore, in the present study, the authors estimate the effectiveness of out-of-state prepared teachers in North Carolina elementary schools. They find that out-of-state prepared teachers

are significantly less effective than in-state prepared and alternative entry teachers; however, there is a substantial overlap in the distributions of effectiveness across groups. Upon testing hypotheses to explain these findings, results indicate that differences in human capital help explain out-of-state prepared teachers' underperformance and suggest the utility of research evidence to inform state policy and local hiring decisions.

Effects of Policy and Practice – Developing World

Improving Educational Outcomes in Developing Countries: Lessons from Rigorous Evaluations

By: Richard J. Murnane and Alejandro J. Ganimian

NBER Working Paper No. 20284

<http://schoolsandhealth.org/Shared%20Documents/Improving%20Education%20Outcomes%20in%20Developing%20Countries%20Lessons%20from%20Rigorous%20Evaluations.pdf>

This paper describes four lessons derived from 115 rigorous impact evaluations of educational initiatives in 33 low- and middle-income countries. First, reducing the costs of going to school and providing alternatives to traditional public schools increase attendance and attainment, but do not consistently increase student achievement. Second, providing information about school quality and returns to schooling generally improves student attainment and achievement, but building parents' capacity works only when focused on tasks they can easily learn to perform. Third, more or better resources do not improve student achievement unless they change children's daily experiences at school. Finally, well-designed incentives for teachers increase their effort and improve the achievement of students in very low performance settings, but low-skilled teachers need specific guidance to reach minimally acceptable levels of instruction.

General Education

Gender Gaps in Primary School Achievement: A Decomposition into Endowments and Returns to IQ and Non-cognitive Factors

By: Bart H. H. Goldsteyn and Trudie Schils

Economics of Education Review (volume 41, August 2014)

Published version:

<http://www.sciencedirect.com/science/article/pii/S0272775714000405>

Working paper version (free): <http://ftp.iza.org/dp8201.pdf>

In elementary school, girls typically outperform boys in languages and boys typically outperform girls in math. The determinants of these differences have remained largely unexplored. Using rich data from Dutch elementary schools, the authors decompose the differences in achievement into gender differences in endowments and returns to IQ and non-cognitive factors. This descriptive analysis is a thought experiment in which we show the consequences for school performance if girls and boys had similar resources and took similar advantage of these resources. The authors findings indicate that gender differences in resources with respect to social and instrumental skills and need for achievement can explain part of the differences in performance. Boys seem to be better equipped with these resources. Additionally, boys and girls employ their skills differently. Girls take more advantage of their IQ than boys. Yet the largest part of this parameter effect is left unexplained by IQ and non-cognitive factors.

The Effect of Personality Traits on Subject Choice and Performance in High School: Evidence from an English Cohort

By: Silvia Mendolia and Ian Walker

Economics of Education Review (in press)

Published version:

<http://www.sciencedirect.com/science/article/pii/S0272775714000909>

Working paper version (free): <http://ftp.iza.org/dp8269.pdf>

This paper investigates the relationship between personality traits in adolescence and performance in high school using a large and recent cohort study. In particular, the authors investigate the impact of locus of control, self-esteem, and work ethics at age 15, on test scores at age 16, and on subject choices and subsequent performance at age 17-18. Individuals with external locus of control or with low levels of self-esteem seem less likely to have good performance in test scores at age 16 and to pursue further studies at 17-18,

especially in mathematics or science. The authors use matching methods to control for a rich set of adolescent and family characteristics, and they find that personality traits do affect study choices and performance in test scores, particularly in mathematics and science.

HOPE for Community College Students: The Impact of Merit Aid on Persistence, Graduation, and Earnings

By: Jilleah G. Welch

Economics of Education Review (in press)

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<http://www.sciencedirect.com/science/article/pii/S0272775714000788>

Working paper version (free):

[http://jilleahwelch.com/pdf/Welch Third Yr Paper 8 2014.pdf](http://jilleahwelch.com/pdf/Welch%20Third%20Yr%20Paper%208%202014.pdf)

Community colleges play a major role in postsecondary education, yet previous research has emphasised the impact of merit aid on four-year students rather than two-year students. Furthermore, researchers have focused on the impact of merit aid on enrolment and outcomes during college, but none have yet considered the impact of aid on earnings after college. This paper utilises discontinuities in eligibility criteria for a large merit scholarship to examine the local impact of aid on student outcomes both during college and after college. The findings suggest that reducing the cost of community college does not impact persistence, academic performance, degree completion, expected earnings, or short-term earnings after college for marginally eligible students.