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How to read research about charter schools' impacts on pupils' achievement

BY STEVE THOMAS

Since it was announced that the Government will be introducing charter schools—to be known in New Zealand as “Partnership Schools,” or *Kura Hourua*—there has been a lot of debate about whether or not overseas charter schools have been successful.¹ Different people seem to reach drastically different conclusions, all claiming “research says.” How is it that this body of research seemingly points to such different conclusions?

There are two main reasons. Firstly, “charter schools” is an incredibly broad term, implying different things in different places.² Secondly, there is a wide range in the quality of evaluative research that has been done on this diverse range of charter schools.³

This note aims to help you dig through the range of charter school research to get a sense of how to judge the findings on charter schools that are emerging. It does so by summarising advice that leading educational and social science researchers have given about how to identify, read and understand high quality charter school research.

How can we tell which charter school research is high quality?

It is difficult to assess charter schools' performance. The task set to researchers is to find ways of estimating something that never happened: how well individual pupils, or groups of pupils, would have performed had they attended a school different to the one they actually did.⁴ You can look to basic statistics like test results to measure pupil achievement at the end of a school year, but to get the best indication of how well pupils are doing in a charter school, you need to be able to assess over time whether or not the performance of a child attending a charter school has improved more or less than it would have had that child stayed at a regular state school. In addition, you must be able to determine that any of the changes—positive or negative—that you see in a pupil's achievement were more likely to have been caused by his/her attendance at a charter school than any other reason.⁵ The best research on charter schools is, therefore, that which can both reasonably determine causality and offer comparisons.

Leading educational researchers, and social scientists more generally, think the strongest methods for determining causality in charter school research are those that use fully-experimental “lottery” techniques which:⁶

- statistically control for pupils' background characteristics;
- statistically control for non-observable pupil characteristics—like parental involvement—that could influence charter schools' impacts on pupils; and/or
- sample a large population over a period of time.

Lottery studies are considered the strongest method because they involve examining the growth in test scores for pupils who are randomly assigned to charter schools from a ballot compared with those who missed out and had to attend regular state schools.⁷ The chief advantage of lottery studies is that they compare pupils who are randomly assigned to charter schools and regular state schools from the same pool of families who are most likely to share the same, sometimes unobservable, hard-to-measure background characteristics, like parents' motivation for getting their children into a good school or the quality of the home environment.⁸ A good counterfactual group is thus created because the only substantial statistical difference between the pupils is whether or not they won the lottery to attend a charter school. This is why fully experimental lottery studies are often said to be the "gold standard" in educational and social science research.⁹

Lottery studies are not free from limitations, however. They are limited to localities where there are more applicants than places at charter schools, so they only enable researchers to examine a specific, usually smaller-scale population.¹⁰ The schools that are subject to a lottery are the popular ones with pupil waiting lists, which means they may not be typical of most charter schools. Moreover, when interpreting lottery study results one should be aware of the bias that is generated as only those pupils who applied to attend a charter school are included in the sample. In other words, while the test and control groups might be statistically equivalent, the lotteried-in pupils' characteristics are likely to be different from those of the general population, so the results may not be relevant to pupils besides those who attended or wished to attend charter schools. These issues mean it is difficult to make generalisations from the findings of lottery studies.

There are other kinds of studies, too, that are not as high quality as lottery studies because they are only quasi-experimental "observational studies." They may employ some of the controls which high quality fully experimental studies use, but their participants are not randomly assigned to the test and control groups. Nevertheless, they still make it possible to compare charter school pupils with equivalent pupils from regular state schools. Quasi-experimental studies generally make these comparisons through using two sorts of methods, by comparing:¹¹

1. individual charter school pupils' test scores *before and after* attending a charter school to see whether or not their learning rates were different to pupils in regular state schools; or
2. charter school pupils' test scores with pupils in regular state schools, *matched* according to various background characteristics, such as income level, ethnic background or language ability.

There may be good reasons why a researcher will use observational methods rather than lottery methods, such as lack of access to a lottery situation or because they are studying a charter school programme's impact after it has been introduced. Still, these methods are not considered fully-experimental because researchers have to deliberately create a counterfactual group to measure growth in test score achievement, which introduces the potential for the researcher to bias the findings, either intentionally or unintentionally, depending on the decisions he/she makes in designing the study.

This means that observational studies have their share of weaknesses. The first method only samples those pupils who move from regular state schools to charter schools, or *vice versa*. Thus, this method may not capture all of the unobserved pupil characteristics that affected why their parents sent them to a different school.¹² For example, if parents saw their child was not doing well at a regular state school, and they were successful in having their child admitted to a charter school, then the impact of the poor performing child might bias the charter school's performance down.

In the case of the second method, which uses a matching method, it is prone to bias resulting from the degree of precision the researchers use in matching up charter school pupils with regular state school pupils. In short, matching methods may not capture unobserved differences among the sampled pupils.¹³ Two students who have the same socio-economic status, the same marks, and the same ethnicity are still

not the same people. All sorts of factors—like the quality of their parental relationship—are important and difficult to measure.

Even given these weaknesses, both types of observational studies can still produce helpful findings because they can allow researchers to study larger samples of pupils and a broader range of schools over a period of time—so long as the sample of pupils and schools studied accurately resembles the entire population of pupils and schools. Thus, observational studies trade-off the accuracy to be found in lottery studies for the ability to make generalisations more easily.

No matter which method—lottery or observational—is used, high quality studies are characterised by their use of good background data on pupils' achievement and traits such as ethnicity, income and educational background, as well as by their longer-term outlook, analysing impacts on pupil achievement over a period of time.¹⁴

As there has only been the opportunity to provide a basic survey of the various methods that have been used to measure charter schools' impacts, interested readers are encouraged to read various papers that leading educational researchers and economists have published which explain in even more detail the strengths and weaknesses of different types of charter school research.¹⁵

How should the findings of research about charter schools' impacts upon pupils' achievement be read and interpreted?

Once one has identified high quality research, there is still the task of working out what the findings mean and how significant an impact (both positive and negative) schools have had on pupils' achievement.

Studies of charter schools' impacts on pupils' achievement often report results in terms of effect sizes, quantified in units of standard deviations. An effect size measures the amount of variation between two groups—in this case, the difference in test scores between pupils' attending charter schools and those in control groups attending regular state schools.¹⁶ It is common for effect sizes to be somewhere between 0 and 1, with an effect size of 0 indicating no effect, and 1 standard deviation representing a very large effect. According to education Professor John Hattie, a 1 standard deviation increase in pupils' achievement could be associated with “advancing children's achievement by two to three years, or improving the rate of learning by 50 percent.”¹⁷

There is some disagreement about exactly how to distinguish between the impacts of different effect sizes below 1, however. Hattie has suggested that ± 0.2 standard deviations could be categorised as small, ± 0.4 as medium and ± 0.6 as large, while statistician Jacob Cohen has described ± 0.2 standard deviations as small, ± 0.5 as medium and ± 0.8 as large.¹⁸ Some leading United States education researchers have considered an effect size of ± 0.1 standard deviations as small, ± 0.2 as medium and ± 0.5 as large.¹⁹ In education studies, it is rare to find effect sizes much larger than those in any of these “medium” categories. If one were to find a large effect size, this might be reason to question the validity of the study's findings.

While whether one thinks of a certain effect size as small, medium or large is open to dispute, this note accepts the definition used by some leading United States education researchers. Typically, effect sizes are quite small for charter schools, so the education researchers' scale gives a finer indication of whether a charter school has a modest, medium or large-sized impact on pupils' achievement. Even if research indicates very small positive effect sizes of 0.01 standard deviations, which are approximately the same as moving up only a few tenths of a percentile rank per year at school, they can still have a beneficial impact on pupils' achievement, especially over time.²⁰

Often effect sizes are reported with a measure of significance, as well.²¹ These basically indicate how confident we can be that an effect exists and is not the result of random chance.

Conclusion: How to read charter school research

The number of charter school studies which are better at determining causality has been increasing.²² Charter school research has still not yet reached definitive conclusions about charter schools' impacts upon pupils' achievement compared to their peers at regular state schools, as this is still an emerging research field, and it is notoriously difficult to assess. Readers of charter schools research ought to be aware of the limitations of the research and couch their judgement of charter schools' effectiveness with respect to these limitations. We should pay heed to the findings of high quality studies, but still avoid making broad generalisations. By attending to the specifics and details in the research findings, we not only get a much better sense of whether charter schools have made a difference to pupils' achievement, but we can also better determine what kind of charter schools and charter school policies are better or worse.

ENDNOTES

- 1 New Zealand Educational Institute, *NZEI Questions and Concerns about Charter Schools* (2012), <http://www.nzei.org.nz/site/nzeite/files/misc%20documents/charter%20schools.pdf> (accessed 3 July 2012); TVNZ, "Debate on Charter Schools," *Q+A*, 5 August 2012; Post Primary Teachers' Association, *Issues in Education: Charter schools* (2012), <http://www.ppta.org.nz/index.php/-issues-in-education/charter-schools> (accessed 16 April 2012); Education Policy Response Group, "Charter Schools for New Zealand" (Massey University College of Education, 2012), ii, vi.
- 2 R.J. Lake, "Should Charter Schools Be More Different Than Alike?" in *Hopes, Fears and Reality 2008. A balanced look at American charter schools in 2008*, ed. R.J. Lake (Washington D.C.: Center on Reinventing Public Education; University of Washington Bothell, 2008), viii.
- 3 J.R. Betts and Y.E. Tang, "Value-added and Experimental Studies of the Effect of Charter Schools on Student Achievement" (Seattle, Washington: National Charter School Research Project; Center on Reinventing Public Education; University of Washington, 2008), 3-4; and J.R. Betts and Y.E. Tang, "The Effect of Charter Schools on Student Achievement: A meta-analysis of the literature," *National Charter School Research Project* (Washington D.C.: Center on Reinventing Public Education, 2011), 3, 57-58.
- 4 P.T. Hill and J.R. Betts, "Improving State and Local Assessments of Charter Schools," in *Hopes, Fears and Reality 2006. A balanced look at American charter schools in 2006*, eds. R.J. Lake and P.T. Hill (Washington D.C.: Center on Reinventing Public Education; University of Washington Bothell, 2006), 39.
- 5 Cf. P.T. Hill and J.R. Betts, "Improving State and Local Assessments of Charter Schools," 37.
- 6 Cf. H.J. Walberg, "School Choice. The findings" (Washington D.C.: Cato Institute, 2007), 9-10.
- 7 L. Lewis and H.A. Patrinos, "Impact Evaluation of Private Sector Participation in Education" (Berkshire, Washington D.C.: CFBT Education Trust; World Bank, 2012), 11, 20; and J.R. Betts and P.T. Hill, "Key Issues in Studying Charter Schools and Achievement: A review and suggestions for national guidelines," *NCSRP White Paper Series*, 2 (Seattle, Washington: National Charter School Research Project; Center on Reinventing Public Education; University of Washington, 2006), 18.
- 8 L. Lewis and H.A. Patrinos, "Impact Evaluation of Private Sector Participation in Education," 11, 20; and J.R. Betts and P.T. Hill, "Key Issues in Studying Charter Schools and Achievement: A review and suggestions for national guidelines," 11.
- 9 See, for example, C.M. Hoxby, "A Serious Statistical Mistake in the CREDO Study of Charter Schools" (Stanford University and the National Bureau of Economic Research, 2009), 2; or A. Leigh, "Randomised Policy Trials," *Agenda* 10, no. 4 (2003): 341-354.
- 10 J.R. Betts and P.T. Hill, "Key Issues in Studying Charter Schools and Achievement: A review and suggestions for national guidelines," 3.
- 11 P.T. Hill and J.R. Betts, "Improving State and Local Assessments of Charter Schools," 37-38.
- 12 J.R. Betts and Y.E. Tang, "The Effect of Charter Schools on Student Achievement: A meta-analysis of the literature," 11-12. To elaborate further, the issue created by sampling those pupils who switch to or from charter schools is that all pupils will be considered in the analysis. Thus, researchers end up using the pupils who remain in regular state schools for the duration of the study period as a comparison group for those who change schools. The problem with estimating charter schools' impact only on pupils who move is that they are likely to have different motivations or characteristics to the pupils who start in a charter school and attend it throughout all of their schooling.
- 13 J.R. Betts and Y.E. Tang, "The Effect of Charter Schools on Student Achievement: A meta-analysis of the literature," 11-12. Economist Caroline Hoxby used, and defended, matching methods in C.M. Hoxby, "Achievement in Charter Schools and Regular Public Schools in the United States: Understanding the differences" (Harvard University and National Bureau of Economic Research (NBER), 2004). In this particular study, a matched school was defined as "the nearest regular public school with a similar racial composition" (p. 3).
- 14 J.R. Betts and P.T. Hill, "Key Issues in Studying Charter Schools and Achievement: A review and suggestions for national guidelines," 11-12, 15-17.
- 15 For example, see: L. Lewis and H.A. Patrinos, "Impact Evaluation of Private Sector Participation in Education"; M. Schlotter, G. Schwerdt and L. Woessmann, "Econometric Methods for Causal Evaluation of Education Policies and Practices: A non-technical guide," *CESifo Working Paper*, 2877 (Munich: CESifo GmbH, 2009); J.R. Betts and Y.E. Tang, "Value-added and Experimental Studies of the Effect of Charter Schools on Student Achievement"; J.R. Betts and P.T. Hill, "Key Issues in Studying Charter Schools and Achievement: A review and suggestions for national guidelines"; or P.T. Hill and J.R. Betts, "Improving State and Local Assessments of Charter Schools."
- 16 R. Coe, "It's the Effect Size, Stupid. What effect size is and why it is important." Paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, England, 12-14 September (2002).
- 17 J.A.C. Hattie, *Visible Learning. A synthesis of over 800 meta-analyses relating to achievement* (London & New York: Routledge, 2009), 7.

- 18 J.A.C. Hattie, *Visible Learning. A synthesis of over 800 meta-analyses relating to achievement*, 9, citing J. Cohen, *Statistical Power Analysis for the Behavioral Sciences*, Second ed. (London & New York: Routledge, 1988).
- 19 See L. Rainey, "Making Sense of Charter School Studies," *Research Brief* (Washington D.C.: National Charter School Research Project; Center on Reinventing Public Education, 2011), 4; and E.A. Hanushek, "Is the 'Evidence-Based Approach' a Good Guide to School Finance Policy?" Prepared for the "Washington Learns" education review (Stanford University; Washington Learns, 2006), 4-6.
- 20 Cf. Betts and Tang's discussion of interpreting standard deviations and effect sizes with respect to school learning gains in terms of percentile ranks. J.R. Betts and Y.E. Tang, "The Effect of Charter Schools on Student Achievement: A meta-analysis of the literature," 28-29.
- 21 R. Coe, "It's the Effect Size, Stupid. What effect size is and why it is important."
- 22 Cf. J.R. Betts and Y.E. Tang, "The Effect of Charter Schools on Student Achievement: A meta-analysis of the literature"; and J.R. Betts and Y.E. Tang, "Value-added and Experimental Studies of the Effect of Charter Schools on Student Achievement."