



Public submission made to the Review to Achieve Educational Excellence in Australian Schools

Submitter: Essential Education Economics (E3)
Submitting as a: Other (Subject Matter Expert (SME))
State: NSW

Summary

The next phase of Australian School Efficiency and Effectiveness modelling will build upon E3's experience in jointly modelling and writing seven international journal articles on Australian School Efficiency and Value for Money Benchmarking and Performance Measurement dimensions. This research includes a Springer published book, "Nonparametric Estimation of Educational Production and Costs using DEA."

Project Report time and cost gradients in each ASERT study element are currently being prepared.

My attention is focused on scoping the necessary steps involved in

- a) the proposed Two Stage study for use by the "GONSKI 2.0" Review team, and
- b) the School Metrics Task Force of the Commonwealth Department of Education. My role is to upgrade the current ACARA's existing 'TOP DOWN' capabilities, as well as setting up the new "BOTTOM UP" Education Evidence Based Board (EEBB) roles in future amendments to the ACARA Legislation.

This latter EEBB body will need to prepare an extensive range of upgraded capability recommendations to be authorised by the Commonwealth Government in amended Commonwealth Legislation to be co-ordinated by the COAG Meeting of First Ministers, presumably in late 2017 or early 2018, (that is the Prime Minister, all Premiers and all State and Territory Education Ministers).

These amendments to the current ACARA Act will need to focus on upgrading its current deficient "TOP DOWN" Monitoring, Benchmarking and Performance Measurement capabilities.

Any amended Legislation will also include new powers for ACARA to undertake extensive and novel "BOTTOM UP" Evaluations using proven Randomised Control Trial, (RCT) Methodologies to recommend better Teaching practices to enhance Student performance across Australian schools.

Details on these draft ACARA future developments are outlined on page 252 from the Productivity Commission “Education Evidence Base” Final Report of 24 May 2017.

Main submission

How to Measure Efficiency

in School Expenditure

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This paper analyses selected existing frameworks for Government Service Provision Performance Measurement and Benchmarking Metrics methodologies used in the context of School Education by:

1. The Australian Productivity Commission and
2. The New Zealand Productivity Commission
3. The UK Department for Education
4. The OECD School Resources Review
5. E3 and SEMETRICA’S current Australian School Efficiency Reporting Template (ASERT).

Government Efficiency Policy Evaluation Frameworks in Australia, the UK, NZ AND the OECD

- (1) The 2016 Australian Productivity Commission’s Report on Government Services (PC-ROGS) Framework relating to School Education

The Logic Model School Performance Measurement Framework developed by E3 using granular data closely mirrors that contained in the annual Australian Productivity Commission Report on Government Service Provision, 2016, PC-ROGS Report, ‘Approach to Performance Measurement’, (1)

The annual Australian PC-ROGS report series outlines a government service performance measurement conceptual framework which includes the principles underpinning their annual assessment of the efficiency and productivity aspects of each State and Territory service provision including School Education.

An explicit cost efficiency and productivity benchmark modelling exercise based on granular school site data is not the purpose of these PC-ROGS annual reports. Rather, they provide an annual inventory and time series of how each sub-federal

jurisdiction has developed their more aggregated budgets based on a standard uniform Accrual Accounting format. Such aggregate data allows analysts to assess for themselves how each jurisdiction is performing.

Utilising this aggregate school program costing, staff personnel and student data sets, the measurement of each State and Territory's performance can be assessed yearly and over time. However other more decentralised Performance studies using granular School Site data can be undertaken using more complex Parametric and Non-Parametric Efficiency and Productivity modelling analytics.

These additional decentralised Econometric Efficiency and Productivity Logic Model approaches are the focus of E3's policy research methodology. Using well curated granular data sets these models are fully applicable to assisting the future efficiency, effectiveness, economy and equity assessment needs of the current "GONSKI 2.0" Educational Excellence Review.

(2) The 2017 New Zealand Productivity Commission's Framework

A recent focus of the New Zealand Productivity Commission's public sector productivity analyses focuses on Quality Adjusting School Education quantity data variables.

This most recent study estimated a range of quality adjusted school productivity measures and discusses the benefits and risks of new approaches regarding teacher salaries and student test performance.

They follow closely the methods of the UK Statistics Office in assessing declining productivity in the NZ School Education sector. Similar comparative studies by the Australian Productivity Commission into assessing and Quality Adjusting Australian School sector performance over time would be a very timely addition to the Public Sector Productivity debate for Australian schools. NZ Productivity Commission, Public Sector Productivity, WP 2017/2, May 2017.

(3) The 2016 United Kingdom Education Efficiency Framework

By contrast the UK Government Department for Education has recently adopted a more explicit mandated policy evaluation framework to measure the efficiency, effectiveness and productivity of its service provision across both School Education and Public Hospital functions. This is well summarised in their documents, "Improving Public Sector Efficiency to Deliver a Smarter State," 25/1/2016, (2)

A specific example of some very relevant School Policy Efficiency Modelling results flowing from this UK initiative across their School Education sector is shown in their recent, "School Efficiency Metric -A Technical Guide" for the calculation of this new School site Efficiency Metric, February, 2016. (3.)

E3 has been in close contact with successive UK School Education Department Policy units since 2011-2012 sharing its diverse School Efficiency Econometric Research project findings contained in seven collaborative peer reviewed School Finance Efficiency and Productivity papers. These E3 research studies have been published in world leading Economic Policy Journals and a book in the Springer International Operations Research and Management Sciences series entitled, “Non-Parametric Analysis of Education Production and Costs using Data Envelopment Analysis,” 2015. (4)

More details on such collaborations are contained in E3’s two submissions, (initial and follow up), to the 2016 Commonwealth Productivity Commission’s Treasury Mandated Inquiry into the “Australian Education Evidence Base” in 2016, (5 and 6).

The final version of this PC Education Evidence Based Report was released on 24 May 2017, which supported the contemporary importance of E3’s extended research methodology as being “a more appropriate top down analytic method for evaluating and measuring the efficiency, effectiveness and value for money of the school education system (E3, submission, 17),” page 108. (7)

(4) The 2016 OECD School Resources Modelling Framework

The 2016 OECD Review of School Funding Policies was aimed at improving the Efficiency and Effectiveness of Resource Use in Schools. (8)

This School Resources Review developed a very detailed Logic Model Conceptual Framework examining how resource inputs into schools should best be distributed, utilised and managed.

Their aim was to distil how best to optimise school outputs whilst encouraging successful teaching and learning within a framework of promoting continuous improvement.

This review also provided analysis and policy advice to help governments and schools achieve effectiveness and efficiency objectives in school education. Their conceptual framework considered four resource types, which result from the overall financial resources available to school education:

- (i) financial transfers,
- (ii) human resources,
- (iii) physical resources and
- (iv) targeted programs

The 2016 OECD framework involved a close analysis of the twin effectiveness and efficiency dimensions incorporating the use of Education Production Functions.

This partial approach however was not as extensive as E3's 4E conceptual framework which incorporates the

- (i) Effectiveness,
- (ii) Efficiency,
- (iii) Economy and
- (iv) Equity dimensions

of Australian School Education outlined below.

(5) E3's "Performance Measurement Logic Model Framework."

E3'S Logic Model based analytical studies over the last decade in Australian School Education have been calibrated with granular school site data sets. These comprehensively model Efficiency, Effectiveness, Economy and Equity Good Governance policy dimensions (10). Currently they are being extended by E3 from October 2017 to May 2018 to inform:-

- (a) The Future upgraded and enhanced ACARA and Productivity Commission's 'TOP DOWN' and 'BOTTOM UP' School Efficiency and Productivity Benchmark Reporting Agenda; and
- (b) The "Gonski 2.0" School Sector Efficiency, Effectiveness and Equity Reporting needs in its current Education Excellence Review Agenda.

E3's future benchmarking studies will cover all 9,600 Government and Non-Government Schools from 2009 to 2017 across Australia's eight jurisdictions using its Australian School Efficiency Reporting Template (ASERT) framework.

Background to E3's School Efficiency Modelling

State Government and Non-Government schools in Australia are both faced with the continuous challenge of maximising student achievement within finite budgetary resources.

Recent commentary in the School Finance literature in Australia has noted the fact that over the last decade or more whilst there has been a large increase in expenditure per government and non-government school student, there has been a corresponding and disappointing fall off in the test scores of students according to comparative PISA and TIMMS international school student achievement levels and in ACARA domestically measured literacy and numeracy achievement rankings.

The next stage of Australian School Funding policy proposals were outlined in the Commonwealth Budget on 9 May 2017, approved by both Houses and contained in Commonwealth Parliamentary legislation of 26 August 2017.

Policy proposals to reverse declining school performance trends are now being assessed by a new Commonwealth sanctioned Review Committee dubbed "The

Gonski Review 2.0," which is required to report on enhancing Australian School Effectiveness and Efficiency, by the end of March 2018.

E3's Perspective on the stated objectives for the new

"Gonski 2.0" Inquiry

In the current Australian Government Budgetary environments it is more important than ever before for schools to operate as efficiently and effectively as possible to optimise the academic impact of every school dollar spent.

Greater value for money objectives should now be incorporated into both government and non-government school funding policies, possibly including a range of innovative teaching programs based on class room "Randomised Control Trial" evaluations. The specific objectives of such proposed RCT studies will be assessed and tested after full documentation from the Federal Legislation is available to School Authorities, which could recommend that a range of remedial steps be introduced for School Performance Improvement purposes.

The specific Efficiency, Effectiveness, Economy and Equity objectives, (the 4E's of Good School Governance proposed by E3 are to:-

- (a) Undertake School Efficiency Performance Measurement studies - which would provide a relative efficiency measurement system to assess each school's effective use of existing resources.

Such studies will provide policy makers with relative efficiency benchmarking scores for individual and groupings of schools to assist on a yearly basis the identification of those schools that are particularly efficient and effective in using their financial resources to optimise student learning.

DEA efficiency models already utilised by E3 enable the relative efficiency of each school using 'Granular' school characteristics to be measured on a relative scale of 0 to 1, for both Learning and Cost Efficiency Drivers in a four quadrant presentation across each year from 2009 to 2016.

- (b) Set up School Efficiency Improvement Studies – to be undertaken in conjunction with the Performance Measurement system outlined above to provide information to foster the more efficient and effective use of school resources aimed at raising student achievement.

Such studies would provide the less efficient schools with improvement targets and benchmarks derived from the highly efficient similar 'comparator' schools to which they can be compared.

Such comparative focused benchmarking studies for use by School Policy Units, Teachers and Principals need to be undertaken across "Statistically

Similar Schools” to compare school groups with like family Socio Economic Status and student characteristics.

These Value for Money studies need to be undertaken with the aim of answering the question of how existing funding from Commonwealth and State sources to individual schools were efficiently and effectively spent on school education from 2009 to 2017.

Accordingly, E3’s modelling studies are intended to answer the dual questions of how well or how efficiently schools spend existing money and assess whether the new level of future Gonski 2.0 funds allocated to them will be effectively and efficiently spent after 2018.

Education specialists are best suited to recommend changes in best practice innovative class room teaching methods using “what works best” criteria, derived from State of the Art Randomised Control Trials.

E3’s School Efficiency Measurement Methodologies

A recent School Efficiency Model is contained in my joint Applied Economics Journal article, February 2016, collaboratively developed with Professors’ Peter Wanke and Carlos Barros entitled “ Cost and Learning Efficiency Drivers in Australian Schools: A Two Stage Network DEA Approach”, Applied Economics. February 2016. (11) This paper provides an up to date assessment of government school efficiency outcomes in New South Wales Government Schools.

The key findings of that paper were:

“The specific policy implications for cost and learning efficiency in Primary and Secondary Australian government schools is that experienced teachers and school location appear to be the most comprehensive and relevant drivers for cost and learning efficiency in Primary and Secondary schools”.

“This particular result indicates the systematic benefits of teacher skills and training in consuming less financial resources whilst generating higher student achievement at the same time. On the other hand, student selectivity appears to be a primary issue of cost and learning efficiency in secondary schools, suggesting that policy makers should pay more attention to the issue of secondary school admission segmentation. In relation to primary education, it is worth noting the role played by attendance and special education offerings on student performance, which suggests a key focus can be found on these issues with regard to learning efficiency”.

“In general terms, the policy implications of this Two-Stage Network DEA research for Australian Schools is the need to adopt similar ‘Benchmarking’ practices for a regular evaluation of their relative efficiency. In addition, these schools should continue to be treated in a segmented way, as the drivers for cost and learning efficiency levels differ substantially between primary and secondary education”.

Whilst this current research has so far been confined to NSW Government Sector schools, future research will consider the application of this Two-Stage Network DEA Model to the other seven State Government School systems as well as the Catholic and Independent Schools school systems across Australia.

Such a policy research extension into these other diverse school governance systems across Australia will help build up the 'big picture' of Cost and Learning Efficiency Drivers in all 9,600 Government and Non-Government schools Australia wide, from 2009-2016 onwards.

Also another up to date very detailed outline of the importance of E3's Modelling results is contained in its initial submission to the Productivity Commission, Commonwealth Treasury Mandated Review into the "Australian Education Evidence Base", and E3's reply to the Productivity Commission's December 2016 Draft Report. (12).

In the Final PC Education Evidence Base report released on 24 May 2017 it was indicated that the detailed research accomplishments completed by E3 thus far:-

"Provides a more appropriate method for measuring the efficiency, effectiveness and value for money of the education system," (Productivity Commission 'Education Evidence Base' Report, p108, 24 May 2017).

New Directions in New South Wales State Government Policies to "Improve the Effectiveness of State Spending."

In the 2017/18 NSW State Budget the government indicated its aim of "transforming and delivering better outcomes for the people of New South Wales- through more transparency and accountability for expenditure and better value for money", NSW Budget Statement, 2017-18, p 4-1. Under the government's Financial Management Transformation program (FMT) this innovation enables "a focus of moving towards a much more comprehensive view of total government spending," (ibid, p 4-1).

"This new approach has the ability to measure and monitor the outcomes achieved for the total dollars invested, and improve the effectiveness of total State spending from 2018/19 onwards". This outcomes approach " will routinely link financial and performance aspects, covering inputs, outputs, efficiency, effectiveness and equity, driving a performance informed decision making culture, with systematic reviews to ensure continued value for money in public spending", (ibid, p 4-2).

These New South Wales Government objectives are fully congruent with E3's 4E Efficiency, Effectiveness, Economy and Equity Logic Model Program Evaluation and Monitoring methodology. This innovative NSW Government focus on Spending Effectiveness now enables E3 to implement its Four E's-"The Four E's of Great Governance" in selected NSW agencies.

E3's Future Performance Measurement proposals

E3's proposed future School Performance Measurement projects will be undertaken in two phases:-

- (1) The first phase will proceed from the release of the Commonwealth Government's Legislated proposals for the "Gonski 2.0" inquiry to focus on "The effective and efficient use of Government funding to improve student outcomes and Australia's National School Performance, as measured by the National and International assessments of student achievement", (May 2, 2017). (13)
- (2) The second phase has been developed in response to the Productivity Commission's release of its final report into the "National Education Evidence Base," emphasising that ACARA significantly increase the rigor and depth of its "TOP DOWN" school site Performance Measurement and Accountability benchmarking evaluation capabilities, (May 24, 2017) (14)

These potential opportunities now involve preparing additional reports Measuring School Efficiency and Productivity Benchmarking for all of the 9,600 schools expanding on E3's two submissions, favourably discussed in the Australian Productivity Commission's "Education Evidence Base" Final Inquiry Report of 24 May 2017, P 108.

→ The above two policy research issues overlap as both the "Gonski 2.0" Education Excellence Review and the ACARA School Performance Measurement Reporting upgrade Legislatively Mandated procedures need to be completed by March 2018; accordingly, E3 can address both analytic modelling issues simultaneously.

These latter developments highlight the relevance, strategic worth and necessity of E3's proposed implementation of its ASERT School Efficiency Logic Model Performance Measurement Framework approach.

This readily implementable ASERT methodology indicates that a clear cut circuit breaker is now available to overcome the existing ACARA School Performance Measurement policy inertia and myopia, (as outlined in its out dated one dimensional, student test score centric report, "Measurement Framework For Schooling in Australia,") May 2015. (15)

E3 is prepared to undertake two future studies to document both government and non - government School Efficiency and Effectiveness Benchmark Performance results over the period 2009-2016.

The initial study will use the 2 variable UK School Efficiency Metric (SEM) methodology, (16). This less data granular, yet quickly implementable UK approach could be undertaken by E3 as a first "test run" with the NSW Government School sector data from 2009-2016.

The UK Department for School Education implemented this methodology across all UK Schools in February 2016, (17)

The second study will use a Two Stage DEA Model with 33 variables per school.

Both School Efficiency Metric Models can then be quickly applied across Australia in all of the remaining 7 State and Territory Government school sectors initially, and then extended to all Non-Government Schools by sector and State for comparison purposes.

Access to all the numerator data, (ACARA test score data), for Primary Years 3 and 5, enables calculation initially of the inter year 'value added' variable for each Primary School followed by all Secondary schools for Years 7 and 9 and Year 12 ATAR University entrance scores in all States year by year from 2009 to 2017.

An additional investigation will focus on the Year 12 ATAR University entrance exam results value added as the Secondary senior school numerator in the School Efficiency equation. For NSW this data will need to be acquired from NESA, (the NSW Education Standards Agency), and similar jurisdictional bodies across Australia.

The denominator data will be total school recurrent income for each Primary and Secondary school for Years 3, 5, 7, 9 and Year 12 initially in NSW, then extending to the other 7 jurisdictions Australia wide.

The final step will be the calculation of the respective Primary and Secondary School Efficiency values by year from 2009 to 2016 as value added divided by the school recurrent income.