Using data to adapt and improve teaching practice

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Three overarching challenges

1. Improve the teaching of the core academic subjects

2. Change elements of what we teach and how we teach it

3. Reduce the gaps between educational haves and have nots

Optimisation and innovation

Few clear solutions
NAPLAN improvement is slow

Equivalent year level (reading)

Source: ACARA, Grattan analysis
Some schools show us the way…

Percentage

- Coin toss
- 3-5 numeracy
- 7-9 numeracy
- 3-5 reading
- 7-9 reading

8% of schools vs 3% by chance

Number of cohorts with above-average progress

Source: ACARA, Grattan analysis
...others are struggling

9% of schools vs 3% by chance

Source: ACARA, Grattan analysis
Learning progress is the key

• Success in education comes from maximising progress

• By definition, stronger progress lifts achievement
But where does data fit?
or
The triumvirate of policy data

NAPLAN RESULTS

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>READING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing</td>
<td>91.8</td>
<td>93.4</td>
<td>95.3</td>
</tr>
<tr>
<td>Spelling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grammar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numeracy</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STUDY SCORE 40 AND OVER COMPARISON

Top performers in mathematics, reading and science

Percentage of students reaching the two highest levels of proficiency

NAPLAN

ATAR

PISA
Big data can inform teaching…

Teacher-directed methods  OR  Inquiry-based methods?
Big data can inform teaching...

### Teacher-directed methods

<table>
<thead>
<tr>
<th>Lessons:</th>
<th>None to few</th>
<th>Some to many</th>
<th>Many to all</th>
</tr>
</thead>
<tbody>
<tr>
<td>None to few</td>
<td>0</td>
<td>+13</td>
<td>+12</td>
</tr>
<tr>
<td>Some to many</td>
<td>-12</td>
<td>+7</td>
<td>+26</td>
</tr>
<tr>
<td>Many to all</td>
<td>-61</td>
<td>-43</td>
<td>-2</td>
</tr>
</tbody>
</table>

**PISA 2015 Science:**

- Average score increase
- Or decrease

“Sweet spot”: teacher-directed learning in most to all classes, inquiry-based learning in some.

*How to improve student educational outcomes: insights from data analytics, McKinsey, 2018*
But small data drives learning
OECD: Australia must shift focus

The overall evaluation and assessment framework appears as highly sophisticated and well conceptualised, especially at its top level (national and systemic levels).

However, there is a less clear articulation of ways for the national agenda to generate improvements in classroom practice through the assessment and evaluation procedures which are closer to the place of learning.

Translation: thumbs up on use of big data

Translation: More effort needed with small data

OECD Review of Evaluation and Assessment in Education, Australia, 2011
The policy conundrum

If top-down approaches (with big data) don’t work …

… and school autonomy (plus small data) isn’t enough …

… how are we supposed to improve at scale?
Three main schools of thought

Focus on **Inputs**
- Teacher quality
- Quality teaching
- Curriculum redesign
- Ed Tech

Focus on **Outputs**
- Standards and testing
- Autonomy and accountability
- Competition and choice

Focus on **Learning Processes**
- "What works"
- School improvement
- Evidence-based education
- Network collaboration
- Spirals of Inquiry, PLCs, etc

Adaptive reform
Adaptive reform blends all three

- Inputs (‘Act’)
- Learning Process (‘Adapt’) 
- Outcomes (‘Evaluate’)

GRATTAN Institute
Strengthening any step can help

Increased adaptive capacity

Better inputs
- Identify the most important inputs
- Be clear on what good inputs look like
- Deliver higher quality inputs

Better outcomes
- Understand what outcomes matter most
- Measure those outcomes better
- Strengthen incentives around outcomes

Better learning processes
- Identify an appropriate learning process
- Understand what the process requires
- Implement the learning process better
Targeted teaching is adaptive

Adapt teaching practice to improve next time round

Assess what each student knows already

Rigorously track progress of each student

Target teaching to each student’s learning needs
Why is it needed?

In disadvantaged high schools, 30% of incoming Year 7 students may be reading at grade 3 level.
However, system support is vital

- Systems to capture & spread best practice
- Culture of continuous improvement
- Ability to track student progress over time
- Learning progressions linked to curriculum
- Assessments linked to teaching resources
- Common formative assessment tasks
- Timetable enables regular discussions between teachers
- Expert support and instructional coaches
Systems need nested loops

Towards an Adaptive Education System, Goss (2017), inspired by The biology of corporate survival (BCG, 2016)
Selection is the critical step

Variation in teaching practice

Higher

Lower

Stagnation and slow decay

“Thousand flowers (or weeds) blooming”

‘Naïve’ school autonomy

Building resilience

Diversity with quality

Highly adaptive system

Good practice but slow improvement

Teaching reading

Effective processes to select and share good practice

‘Naïve’ school autonomy

Building resilience

Teaching reading

7,000 flowers (or weeds) blooming”
What helps good local decisions?

**Central guidance**
- A clear view on education excellence
- A strong and accessible evidence-base
- Invest in tools for teaching & assessment
- Tracking and evaluation of policy outcomes
- Detailed benchmarking and analysis

**Regional support**
- Clarify what high-functioning schools look like
- Practical support to help implement policy
- Processes to identify good or bad practice
- Ways to share good practice across schools

**In-school capability**
- Access to expert teachers
- Ability to track student progress over time
- Time, tools, training, teamwork and trust
- Opportunities to observe and be observed

**Leadership**
- Levers to strengthen selection & sharing of good practice
Five ‘guide-posts’ for the future

Better data in hands of teachers: trusted; timely; practical

Invest in our most expert teachers

Optimise practice in core academic areas…

… and innovate more systematically for a changing world

Focus more on system design