# GRATTAN
## Institute

# Catching up:

Learning from the best school systems in East Asia

Ben Jensen

Summary report

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## Overview

Today's centre of high performance in school education is East Asia. Four of the world's five highest-performing systems are Hong Kong, Korea, Shanghai and Singapore, according to OECD's 2009 PISA assessments of students. In Shanghai, the average 15-year old mathematics student is performing at a level two to three years above his or her counterpart in Australia, the USA, the UK and Europe.

In recent years, many OECD countries have substantially increased education expenditure, often with disappointing results. Between 2000 and 2008, average expenditure per student rose by 34% across the OECD. Large increases in expenditure have also occurred in Australia, yet student performance has fallen.

The global economic crisis demands budget cuts. Yet education performance is vital to economic growth. As the world's economic centre is shifting to the East, we can learn from its most effective school systems about reforms to improve our children's lives.

Success in these four systems is not always the result of spending more money. Korea, for example, spends less per student than the OECD average. Nor is success culturally determined, a product of Confucianism, rote learning or Tiger Mothers. Only 11 years ago, Hong Kong ranked 17th in assessments of reading literacy (PIRLS) and Singapore was ranked 15th. Just five years later (in 2006) they ranked 2nd and 4th.

The report does not claim that the political and policymaking systems of East Asia can or should be reproduced elsewhere. Each country has to tailor reform to its own system and culture.

However, these four systems focus on the things that are known to matter in the classroom, including a relentless, practical focus on learning and the creation of a strong culture of teacher education, research, collaboration, mentoring, feedback and sustained professional development. These are precisely the reforms that Australia and other western countries are trying to embed in schools. Yet there is often a disconnect between the objective of policies and their impact in classrooms. The four East Asian systems have found ways to connect high-level strategy to what others have been trying to achieve in the classroom.

The role of teachers is essential: they are partners in reform. In Singapore, they are paid civil servants during their initial teacher education. In Korea they must pass entrance examinations, including classroom demonstrations, before becoming teachers. In Shanghai, all teachers have mentors. New teachers have district-based mentors and two in-school mentors (one on classroom management, the other on subject content). In Hong Kong, classroom observations aim to change teacher culture and improve pedagogy. The focus is on openness to new ideas and career-long teacher learning. These four systems are not afraid to make difficult trade-offs to achieve their goals. Shanghai, for example, has larger class sizes to give teachers more time for school-based research to improve learning and teaching.

These systems are neither perfect nor universally popular. Hong Kong acknowledges that its move away from a strict examination focus has not yet persuaded most parents. Yet many countries are trying to emulate the success of these systems. Most have further to go. This report shows in detail how it can be done.

# Table of Contents

# 1. How we wrote this report and how to read it

In September, 2011, the Grattan Institute, in association with Asialink, the Asia Education Foundation and the Victorian Department of Education and Early Childhood Development, brought together educators from Australia and four of the world's top five school systems: Hong Kong, Shanghai, Korea and Singapore. The 'Learning from the Best Roundtable', attended by the Prime Minister, Julia Gillard, and the Commonwealth School Education Minister, Peter Garrett, sought to analyse the success of these four systems, and what practical lessons it provided for Australia and other countries.

Following the Roundtable, researchers from Grattan Institute visited the four education systems studied in this report. They met educators, government officials, school principals, teachers and researchers. They collected extensive documentation at central, district and school levels. Grattan Institute has used this field research and the lessons taken from the Roundtable to write the report.

This Summary Report examines how the four East Asian systems we studied designed and delivered their reforms. The accompanying Detailed Analysis Report provides substantially more information on the design and implementation of reforms and the programs that underpin success.

In the Summary Report, Chapter 2 examines the main features of the success of these four East Asian systems, while Chapter 3 considers why their performance has risen so sharply in recent years, and why it has not in most other OECD countries. Chapter 4 discusses effective teaching and learning and explains why

each education system must arrive at its own definition of these concepts. Chapter 5 considers key steps in successful education reform, and Chapter 6 looks at best practice: how such a strategy was defined and executed in Hong Kong.

Chapters 7 to 12 examine six policy areas and programs – in initial teacher education, school principal education, induction and mentoring, classroom observation, research and lesson groups, and teacher career structures – that have been integral to the success of one or more of the four East Asian systems studied.

No country can import another's culture. Yet what is striking about these six program areas is that they focus unrelentingly on learning in the classroom. This is precisely what many other education systems say is their policy objective.

While the findings of the Summary Report should interest all people with a stake in education, we also hope the extensive material on education reform, design and implementation of programs in the accompanying Detailed Analysis will assist educators and policymakers undertaking the task of designing and executing school education reform.

**Box 1.1 Learning from the Best: A Grattan Institute Roundtable on High-Performing Systems in East Asia**

Grattan Institute, in association with Asialink, the Asia Education Foundation and the Victorian Department of Education and Early Childhood Development, convened a Roundtable on 27-28 September 2011 in Melbourne, Australia to learn from high-performing education systems in East Asia. The Roundtable was attended by:

- The Prime Minister of Australia, The Hon. Julia Gillard PM

- Australia's Federal Minister for Education Mr Peter Garrett MP

- Dr Andreas Schleicher, Special Advisor on Education Policy to the OECD Secretary-General and Deputy Director, OECD Directorate for Education

- Professor Cheng Kai-Ming, Chair Professor of Education, the University of Hong Kong, Hong Kong Special Administrative Region

- Dr Shin Hye-Sook, Research Fellow, Korean Educational Development Institute

- Professor Tan Oon-Seng, Dean, Teacher Education, National Institute of Education, Singapore

- Prof Yong Zhao, Presidential Chair and Associate Dean, Department of Educational Methodology, Policy and Leadership, University of Oregon

- Dr Yu Hyun-sook, Director-General, Korean Educational Development Institute

- Dr Zhang Minxuan, President, Shanghai Normal University

- Secretaries/Directors General of Education throughout Australia

- Roundtable Chairs: Ben Jensen (Grattan Institute) and Tony Mackay (Asia Education Foundation).

Four research partners significantly contributed to the Roundtable:



The Roundtable was presented in association with



For a full list of participants see Appendix B.

## 2. East Asian success: high performance, high equity

The latest OECD PISA results show that four of the world's five top performing school systems are Hong Kong, Korea, Singapore and Shanghai.

**Figure 1 – PISA mean scores for reading, maths and science (2009)**
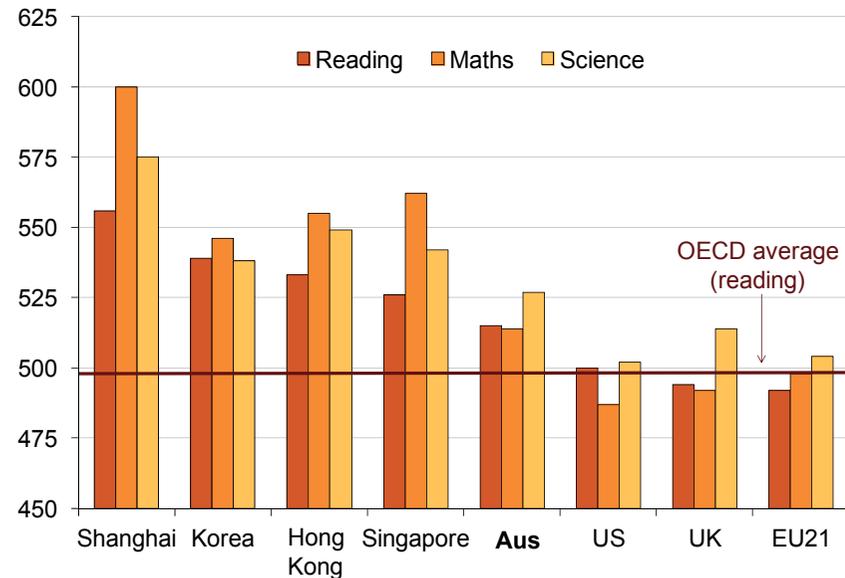


*Source: OECD (2010b)*

In Shanghai, the average 15-year old mathematics student is performing at a level two to three years above his or her counterpart in Australia, the US, the UK or Europe.

Korean students are at least a year ahead of USA and EU students and 7 months ahead of Australian students in reading. Hong Kong and Singaporean students are at least a year ahead of the USA and EU students in science.

**Figure 2 – How many months behind? Differences in PISA performance (2009)**

| | US | | | UK | | | EU21* | | | Australia | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Read | Math. | Sci. | Read | Math. | Sci. | Read | Math. | Sci. | Read | Math. | Sci. |
| Shanghai | 17 | 33 | 23 | 19 | 32 | 19 | 20 | 30 | 23 | 13 | 25 | 15 |
| Hong Kong | 10 | 20 | 15 | 14 | 18 | 8 | 13 | 17 | 14 | 6 | 12 | 7 |
| Singapore | 8 | 22 | 13 | 12 | 20 | 11 | 10 | 19 | 12 | 3 | 14 | 5 |
| Korea | 12 | 17 | 11 | 10 | 16 | 9 | 14 | 14 | 11 | 7 | 9 | 3 |

☐ < 1 year behind  ☐ 1 to 2 years behind  ☐ > 2 years behind

*Note:* *\*Unweighted average; figures represent the difference in PISA 2009 performance (expressed in the number of months of school education). For example, the average 15 y.o. student in the USA performs at a level that is 17 months behind the average 15y.o. student in Shanghai in reading literacy.*

*Source:* *OECD (2010b)*

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**Box 2.1: How are students assessed in PISA?**

The OECD's Programme for International School Assessment (PISA) is a series of extensive and rigorous international surveys to assess the knowledge and skills of 15 year-olds. More than 70 countries participated in the most recent round of assessment.

The tests are designed to capture how well students are equipped to apply academic skills in real-world situations. "The emphasis is on mastering processes, understanding concepts and functioning in various contexts."[1]  Students are asked to compose long-form answers, as well as answer multiple-choice questions. Both parts assess problem-solving skills.

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### 2.1.1    High performance that keeps improving

Improvement in performance in these four systems has been rapid. For example:

- Between 2000 and 2009, Korea's mean reading score improved by 15 points (equivalent to nearly 5 months learning), on top of decades of improvement. Hong Kong improved by 8 points (as seen in Figure 3).

- Shanghai and Singapore participated in PISA for the first time in 2009 and ranked 1st and 5th in mean reading scores of countries tested.[2]

- As recently as 2001, Hong Kong was ranked 17th in international assessments of reading literacy (PIRLS) and Singapore was ranked 15th. In 2006, they were ranked 2nd and 4th respectively.[3]

**Figure 3 - Change in PISA mean reading scores from 2000 to 2009**
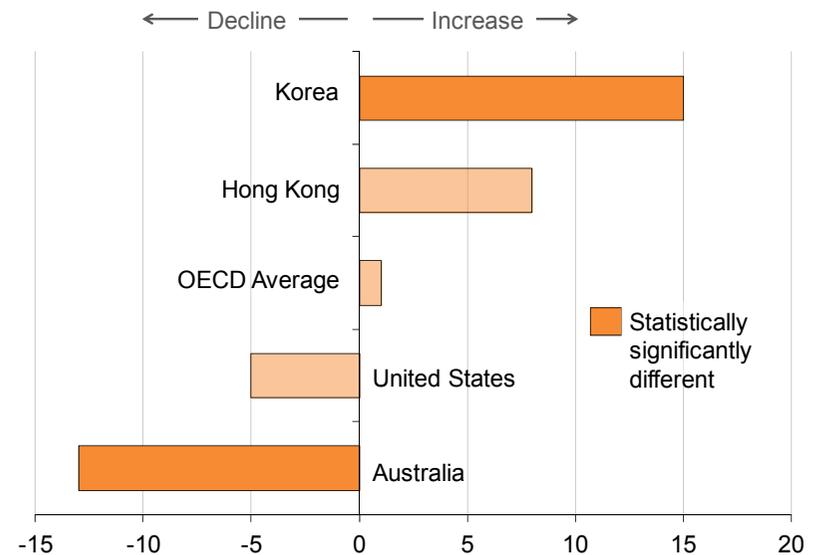


*Source: OECD (2010a)*

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[1] OECD (2010b)
[2] Ibid.

[3] Mullis, *et al.* (2007)

### 2.1.2    High levels of equity

These four systems have successfully increased performance while maintaining, and often increasing, equity. Compared to Australia and most OECD countries, a child from a poorer background in these systems is less likely to drop out or fall behind.[4]

Figure 4 shows that there is less of a gap between high and low performing students in Korea, Shanghai and Hong Kong compared to many other OECD education systems.

**Figure 4 – Low and high performing students: the difference between bottom 10% and top 10% in reading (PISA 2009)**
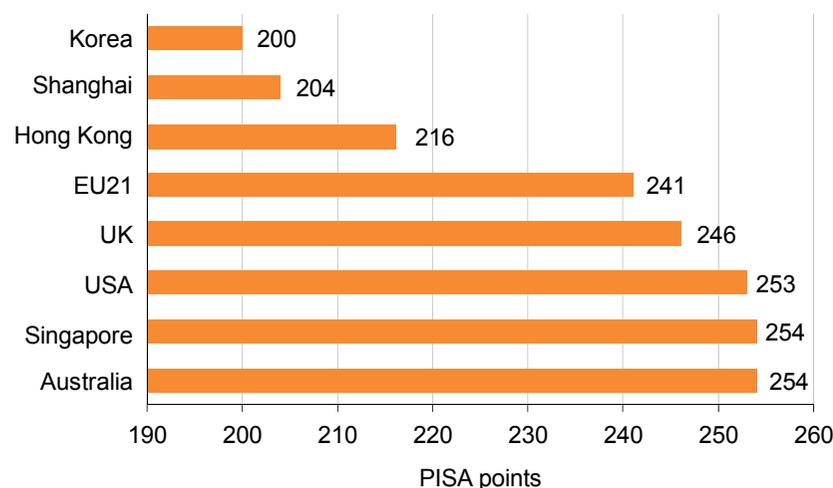


*Source: OECD (2010b)*

Low performing students are also better prepared for their future. The bottom 10% of maths students in Shanghai perform at a level that is 21 months ahead of the bottom 10% of students in Australia. This gap rises to 24 months in the UK, 25 across the average of the OECD, and 28 months in the USA.[5]

### 2.1.3    High Participation

Increasing performance and equity has been achieved with high and increasing participation. For example, 30 years ago about 40% of young Koreans (aged 25-34) finished secondary education. Now the figure is 98%, ten percentage points above the OECD average.[6]

### 2.1.4    High Efficiency

The world's best school systems are rarely the world's biggest spenders.[7]  Korea spends much less per student than other education systems, yet achieves far better student performance.

Many systems continue to increase expenditure with little impact. Australian school expenditure has increased dramatically. Between 2000 and 2009, real expenditure on education increased by 44%.[8] The average cost of non-government school fees rose by 25%.[9] Despite this increase, Australia was only one of four

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[4] OECD (2010b)

[5] OECD (2010b)
[6] OECD (2011)
[7] Hanushek and Raymond (2004)
[8] Combines real schooling expenditure for State and Territory and Commonwealth governments. MCEETYA (2001) Figure 3.1; ACARA (2009) Figure 8.1
[9] Ibid.

countries that recorded a statistically significant decrease in PISA reading scores from 2000 to 2009.

**Table 1 - Annual expenditure per student in selected OECD countries (2008)**

|  | Primary (USD) | Secondary USD) |
|---|---|---|
| OECD average | 7,153 | 8,972 |
| Australia | 6,723 | 9,052 |
| Korea | 5,420 | 7,931 |
| United Kingdom | 8,758 | 9,487 |
| United States | 9,982 | 12,097 |
| EU19 average | 6,479 | 8,116 |

Notes: *figures are expressed in equivalent USD converted using PPPs for GDP, by level of education and type of service, based on full-time equivalents for educational institutions on core services, ancillary services and R&D.*

Source: *OECD (2011)*

# 3. Why are these systems moving rapidly ahead of others?

Popular stereotypes about Asian education are strong in some countries. But the evidence challenges these beliefs. In these four systems, high performance comes from effective education strategies that focus on implementation and well-designed programs that continuously improve learning and teaching.

Neither cultural difference nor Confucian values can explain how, in just five years, Hong Kong moved from 17th to 2nd in PIRLS (the international assessment of Grade 4 students' reading literacy). Instead, education reforms created rapid changes in reading literacy.

Success cannot be explained by rote learning, either. PISA assesses meta-cognitive content knowledge and problem solving abilities. These skills are not conducive to rote learning. In fact, rote learning in preparation for PISA assessment would lead to lower scores (see Annex A for examples of questions in the PISA assessments). Moreover, international research shows that classroom lessons in Hong Kong, for example, require greater deductive reasoning, with more new and advanced content.[10]

Success is also not driven by the size of the system. These systems vary in size. Korea is much larger, with more than 30 times the number of schools as Singapore (see Table 2).

**Table 2 – Size of East Asian education systems**

|  | Shanghai[11] | Korea[12] | Hong Kong[13] | Singapore[14] |
|---|---|---|---|---|
| No. schools | 1,622 | 11,312 | 1,105 | 343 |
| No. students | 1,322,800 | 7,260,996 | 780,849 | 490,246 |
| No. teachers | 104,700 | 412,634 | 51,871 | 28,073 |

*Note: for sources see footnotes*

**Figure 5 – Size doesn't matter: change in PISA performance of Australian States and Territories (reading 2000-2009)**



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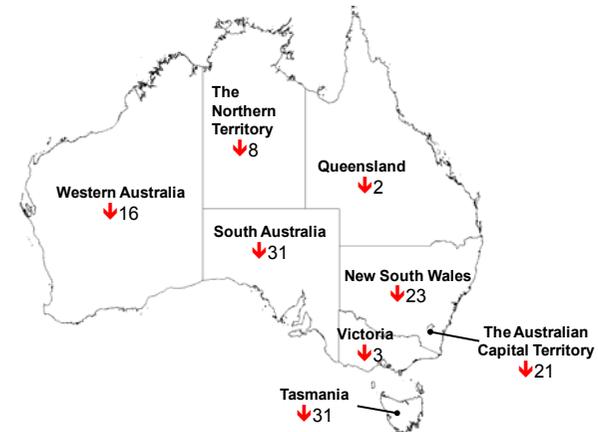
[11] Excludes special schools. Shanghai Education Commission (2011)
[12] Includes vocational high schools, excludes special schools. See http://english.mest.go.kr/web/1723/site/contents/en/en_0219.jsp
[13] Education Bureau (2011a), Education Bureau (2011b)
[14] Excluding Junior college/centralised institutes, pre-university education. Minstry of Education (2011).

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[10] US Department of Education (2003)

### There is growing global agreement on what works in schools

A body of international research has identified the common characteristics of high-performing systems.[15] They:

- Pay attention to what works and what doesn't work. They attend to best practice internationally, give close attention to measuring success, and understand the state and needs of their system.

- Value teachers and understand their profession to be complex. They attract high quality candidates, turn them into effective instructors and build a career structure that rewards good teaching.

- Focus on learning and on building teacher capacity to provide it. Teachers are educated to diagnose the style and progress of a child's learning. Mentoring, classroom observation and constructive feedback create more professional, collaborative teachers.

These are the objectives of education policies around the world.

### Systems in East Asia are implementing what works

The four systems studied in this report have introduced one or several of the following reforms. In particular they:

- **Provide high quality initial teacher education**. In Singapore, students are paid civil servants during their initial

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[15] For example, see Barber and Mourshed (2007), Mourshed, *et al.* (2010) and OECD (2010b).

teacher education.  Government evaluations have bite and can close down ineffective teacher education courses.

- **Provide mentoring that continually improves learning and teaching**. In Shanghai, all teachers have mentors, and new teachers have several mentors who observe and give feedback on their classes.

- **View teachers as researchers**. In Shanghai teachers belong to research groups that continually develop and evaluate innovative teaching. They cannot rise to advanced teacher status without having a published paper peer reviewed.

- **Use classroom observation**. Teachers regularly observe each other's classes, providing instant feedback to improve each student's learning.

- **Promote effective teachers and give them more responsibility for learning and teaching**. Master teachers are responsible for improving teaching throughout the system.

### In many other countries, including Australia, there is a disconnect between policy and classrooms

The OECD's 2008 Teaching and Learning International Survey (TALIS) revealed a large gap between policy objectives and results in the classroom in many education systems. In particular:

- **Mentoring and induction programs are poor.** Most countries, including Australia, have such programs. Yet new teachers say they often fail to provide constructive feedback

based on classroom observations. They are disconnected from student learning.

- **Teacher development is often not suited to teachers' needs**. One-off courses are common even though teachers believe, and the evidence shows, that longer-term individual and collaborative research has the greatest impact on student learning.

- **Effective teaching is not recognised**. Nearly three-quarters of teachers - and 90% of Australian teachers - say they would receive no recognition if they improved the quality of their teaching or were more innovative in the classroom.

- **Feedback to improve teaching is poor.** Nearly half of teachers report that appraisal of their work has little impact on their teaching and is largely just an administrative exercise.[16]

In addition, **initial teacher education often fails to prepare effective teachers**. Many teachers find their initial education disconnected from the requirements for classroom teaching. Many courses have been found not to increase teacher effectiveness.[17]

**East Asian systems understand the need for trade-offs to improve learning and teaching**

Developing learning and teaching is time-intensive. There is no point pretending it isn't. Trade-offs are therefore required to improve learning and teaching.

In Shanghai, a key trade-off is that teachers teach larger, but fewer, classes compared to most other systems. Teachers teach classes of up to 40 students for 10-12 hours each week. In the US, teachers teach an average of 23 students for 30 hours a week (see Table 3).

Shanghai's approach frees up a significant amount of non-teaching time to engage in other activities known to have a large impact on student learning (see Figure 6). These include preparing for lessons, teacher collaboration, classroom observation and giving feedback.

By contrast, Australian teachers have only half as much time for these activities. And American teachers have only 12 minutes between each class to concentrate on the activities that are so important in high-performing systems in East Asia.[18]

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[16] OECD (2009a)
[17] OECD (2005)

[18]Grattan calculations, assuming 45min classes and a 38-hour working week.

**Table 3 – Average weekly teaching time and class size (lower secondary)**

| | Average weekly teaching hours | Class size |
|---|---|---|
| **Shanghai** | **10-12*** | **40*** |
| **Korea** | 15 | 35 |
| **Hong Kong** | 17** | 36** |
| **Singapore** | - | 35** |
| **Australia** | 20 | 23 |
| **US** | 30 | 23 |
| **England** | 19 | 21† |
| **EU21** | 17 | 22 |
| **OECD Average** | 18 | 24 |

Notes:     *Grattan Institute interviews with Shanghai Municipal Education Commission,2011; **Grattan Institute interviews, † Hong Kong Education Bureau (secondary).

Sources:OECD, (2011) Education at a Glance: Table D4.1, Table D2.1.

**Figure 6 – Helping teachers focus on what matters: average time spent teaching per week in Shanghai and Australia**
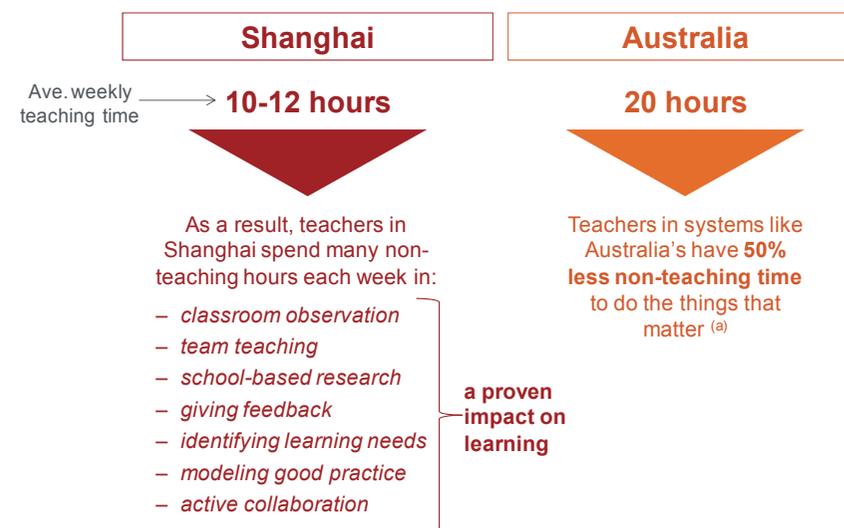


Note: [a]assumes a 38 hour working week.

## 4.    What is effective learning and teaching?

Each of the high performing systems in East Asia undertook a deep analysis of learning and teaching at the start of their reforms. For example, Hong Kong began with a 20-month investigation of the state of learning and where it needed to be. The findings of that study determined all subsequent reform efforts.

This report does not seek to prescribe a definition of effective teaching and learning. That is for every education system and, to varying degrees, for every school to determine. But it should be based on evidence of what works in the classroom.[19]

The OECD Teaching and Learning Internal Survey (TALIS) identifies key aspects of teaching that have been shown to improve learning. They include:

* Teachers' content knowledge.

* Teachers' pedagogical knowledge, both of general principles and those specific to their subject.

* Teaching practices that focus on clear and well-structured lessons supported by effective classroom management.

* Teaching practices that emphasise individualised instruction.

* A commitment to higher-order problem solving, deep analysis of content, and activities requiring advanced thinking skills and deductive reasoning.

* Active professional collaboration that has a direct impact on learning and teaching. Key elements include classroom observations, team teaching and constructive feedback.

Two additional factors emphasise classroom management skills: the proportion of classroom time that is actually used for effective learning and teaching;[20] and, school and classroom climate.[21]

The evidence shows that these are universal qualities of good teaching, and improve student learning.[22] Yet every education system can add to them, emphasising particular styles or aspects of teaching and learning.

The point is not which styles of learning and teaching are chosen, but the degree of precision with which they are articulated. School reform is about changing behaviour to improve learning and teaching. Therefore, reform must start by identifying what those behaviours currently are - the state of learning and teaching - and where they should be. Reform can then target the required behavioural change.

[19] Barber and Mourshed (2007)

[20] Klieme and Rakoczy (2003); Clausen (2002).
[21] Hopkins (2005); Lee and Williams (2006); Harris and Chirspeels (2006).
[22] OECD (2009a); OECD (2010c)

# 5. Connecting policy to classroom learning

The four school systems in East Asia focus on policies designed to improve learning and teaching. Effective implementation connects policy to classrooms. This chapter shows how they have selected the right policies and then designed and implemented programs to change behaviour in schools and classrooms.

## 5.1 Selecting interventions

Effective intervention begins with a deep analysis of learning. The analysis compares the current state of learning (and then teaching) to where learning and teaching needs to be. To move learning and teaching to a higher level requires the design of policies and programs to target behavioural change. This requires effective implementation of programs that have been shown to make widespread and sustained improvements in learning and teaching.

### 5.1.1 Improved learning as the primary goal

While considerable research has emphasised the importance of teachers,[23] reform in Hong Kong, for example, "clearly focussed on the 'core business of learning'".[24]

The key criterion here is learning, not teaching or, more importantly, teachers. The difference is subtle but important, with substantial policy implications. For example, a focus on learning in

Singapore, has led the National Institute of Education (NIE), which educates all teachers, to cut subjects such as history and philosophy of education, and curriculum and assessment design, from their undergraduate teacher education syllabus. Feedback from teachers, principals and the Ministry of Education showed that these subjects were not leading to sufficient increases in students' learning. NIE now focuses more on subjects emphasising practical classroom teaching.

### 5.1.2 Setting priorities

Successful implementation depends on careful prioritisation. Implementation is resource intensive. It requires difficult decisions in allocating resources between programs. Financial resources are always scarce, yet are relatively visible. Management and teachers' time and capacity for change are also scarce resources. The lack of correlation between financial resources and learning outcomes suggests that time and capacity may be greater constraints than financial resources.

Trying to do too much thus often results in very little being done at all. Choosing not do something is often politically difficult, but successful implementation requires prioritising fewer programs, and cutting those with less impact on student learning. The process is vital. In short, doing what matters is easy. *Only* doing what *really* matters is hard.

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[23] OECD (2009)
[24] Prof. Cheng, Kai-ming, Grattan Institute Learning from the Best Roundtable, Melbourne, September, 2011.

### 5.1.3    A mix of "push" and "pull"

Reforms that affect learning and teaching can be divided into:

- Push reforms that propel: they generate momentum for change by providing teachers and students with new content and support to improve current practice; and

- Pull reforms that compel: they create imperatives for change by setting new standards teachers and students must reach to fulfil organisational requirements.

The impact of the mix of reforms on the push and pull of learning and teaching in classrooms needs to be mapped. It ensures all reforms are heading in the right direction, and facilitates prioritisation by identifying ineffective reforms.

### 5.2. Changing behaviour

Reform of learning and teaching is all about behavioural change. Unless principals, teachers and students change their behaviour, outcomes are unlikely to change. But it is inherently difficult for policy makers to effect a change in the behaviour of others.

The general literature on behaviour change suggests that people will change their behaviour if:[25]

- They have a **purpose** to believe in

- **Role models** act consistently

- They have the **skills and capacity** for the new behaviour, and

- **Reinforcement systems** such as performance measures are consistent.

Successful implementation seems to require *all* of these elements to be present. This general theory is consistent with a growing body of evidence about what makes for successful education reform.[26]

Careful prioritisation and an implementation plan may still encounter resistance to change. Some bureaucrats, teachers, parents and students may be fearful, and reluctant to change. Every system has established interest groups that may seek to preserve their interests even when those interests may not serve the system's goals.[27] Whether these forces prevent implementation fundamentally depends on the political will for change.

Given the different nature of the political systems in East Asia, we have not focused specifically on how all of these political issues were negotiated. Every system must tailor reform to its own culture and context.

*A fuller discussion of strategy in the four systems in East Asia and the implementation of effective education reform appears in the Detailed Analysis Report.*

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[25] Lawson and Price (2003)

[26] Barber and Mourshed (2007); Barber (2008)  Barber, *et al.* (2011); Fullan (2009); Levin (2008); Brown, *et al.* (2011).
[27] Levin (2008)

# 6. Best practice reform: Hong Kong

In 1997 the United Kingdom restored Hong Kong to the People's Republic of China. Two years later, Hong Kong embarked on systemic education reform to prepare its children for the transition to a knowledge economy in a global labour market.

Hong Kong is a prime example of successful education strategy and implementation. Since 1999, it has reformed the entire education system using a 'whole-system implementation' approach.

Hong Kong conducted its strategy design and implementation planning in parallel. The process took 20 months and involved intense community consultation. Government, academic and business leaders, school principals and teachers all provided advice. This created an in-depth understanding of the problem, and of the context in which reform would be implemented.

## Improving learning: choosing a strategic objective

Hong Kong's reforms were designed around one central objective: to improve student learning. An in-depth analysis identified that student learning was monotonous and exam-driven, and provided little room to 'think, explore and create'.[28] Teaching had become a one-way transmission process and learning had become passive.[29] Hong Kong wanted children to engage with learning activities, building on what they know, interacting, creating and exploring new knowledge.[30] Its new definition of learning was a

major shift from the previous emphasis on 'knowledge acquisition'.[31] The new definition allowed Hong Kong authorities to map the difference between what student learning had been and what they wanted it to become.

## Reforming teaching to improve learning: choosing the right policy levers

Hong Kong identified that improving teaching was the single most important policy lever to improve learning. By analysing learning, they were also able to map the change required to take teaching from what it was to where it should be.

Hong Kong wanted students to develop learning skills rather than purely acquiring academic knowledge. Therefore it wanted teachers to move from directly transmitting knowledge to a constructivist approach: from the drilling of students to providing broad learning experiences. These included project and enquiry-based learning to help students develop critical thinking, problem solving and communication skills.

Hong Kong also introduced integrated learning areas rather than compartmentalised subjects. It moved beyond an exclusive focus on text books to adopt diversified learning and teaching resources to deliver curriculum. Formative assessments were emphasised, showing *how* students were learning, rather than simply *what* they learnt.

[28] Education Commission (2000)
[29] Curriculum Development Council (2000)
[30] Education Commission (2000)

[31] Grattan Institute interviews at Education Bureau, Hong Kong, (2011)

## Implementation

Hong Kong's success has stemmed from its detailed and precise approach to whole-system implementation. It undertook implementation planning simultaneously with strategy design; one was not separate from the other. The focus throughout was how to implement the reforms in schools and classrooms to increase learning.

Hong Kong used every part of its education system as implementation tools to reform teaching and pedagogy. Below is a brief description of how each element of the system was used:

- *Curriculum reform* was the 'push' of reform, the key to changing pedagogy. Curriculum reform helped shift teachers' thinking from 'what' students should learn to 'how' they learn. It focused teachers on providing 'learning experiences' for students rather than simply transmitting knowledge. Throughout the new curriculum framework, expectations were outlined for students' learning experiences and practical examples of teaching strategies were provided.

- *Reform to student assessment* was the major 'pull' to improve pedagogy. Changes to student assessments focused on shifting the reliance on written tests and exams that tested *what* students had learned to broader assessment tools and mechanisms that also assessed *how* students learn. Hong Kong:

  - Removed high-stakes public exams to ease the pressure on students and teachers to prepare for exams, giving greater time in school to focus on improving learning;

  - Introduced assessment for learning (formative assessment) to help teachers' identify how their students were learning and to change their pedagogy where necessary; and

  - Introduced school-based assessment, allowing teachers to assess learning that cannot be demonstrated in paper and pencil exams.

- *Teaching and learning resources* were developed for teachers to implement curriculum and assessment changes, with practical examples that shifted teachers' approaches in the classroom.

- *School leadership* was vital in improving teaching practice. Hong Kong created new leadership positions in order to put implementation leaders into every school. Curriculum leaders were assigned to every primary school. In secondary schools curriculum leaders were assigned to every key learning area. They were given extensive training on curriculum and pedagogy reform, enabling them to help other teachers to implement changes in every classroom.

- Hong Kong built *school principals' capacity* to implement reforms. Aspiring principals now complete a certification in principalship that specifically includes detail on the strategic direction and policy environment of education in Hong Kong. They also study learning, teaching, the curriculum, teachers' professional development and quality assurance, and accountability.

- *Academic research funds* were established for academics to work with schools to implement reforms to learning and teaching.

- *Teacher professional development and in-school support* were essential to implement behavioural and cultural change in schools and classrooms. Hong Kong teachers must undertake professional development that both continues to develop their competencies,[32] and assists in implementing reform through the Continuing Professional Development Framework.[33]

  In-school support programs provide expert support for teachers to implement reforms. The support includes collaborative lesson planning and collaborative research and development projects. Further professional development includes workshops, study groups and sharing sessions, and consultancy services for curriculum and pedagogy issues.

- *Teachers' teaching and working time* was altered to improve collaboration, learning and capacity building. Collaborative lesson preparation was introduced and a culture of classroom observation developed to help teachers learn from each other.

- *School accountability: whole-school inspections* provided an accountability mechanism to monitor, evaluate and enforce the implementation of improved teaching practice.

- *School accountability: Focused inspections* concentrated on a particular area of reform. Teams of staff from the Education

Bureau (EDB) provide support for introducing peer feedback in schools and developing teachers to implement pedagogical changes.

- *Increased school autonomy* for school principals and teachers was important. It gave principals and teachers a sense of ownership and control over the changes and facilitated ground level implementation in schools and classrooms.

### Allocating resources, then reallocating them following feedback and evaluation

Around the world, resources are often allocated to the design of programs but far less to the implementation of them. In Hong Kong, resources were specifically set aside for implementation. Resource priority was accorded to changes to basic education in primary and early secondary school. Funds were explicitly matched to implementation timelines. Additional recurrent funding was earmarked for primary and secondary schools to employ extra staff or services that would help reduce teachers' workloads, giving them additional time to implement reforms.[34]

*The Detailed Analysis report provides a case study of the implementation of a new reading pedagogy that led to Hong Kong making dramatic improvements in reading literacy. The following six chapters of this report examine the programs behind the success of these four East Asian systems.*

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[32] As described in the Teachers' Competency Framework Advisory Committee on Teacher Education and Qualifications (2003)
[33] Ibid.

[34] Education Commission (2000)

# 7. Initial teacher education

## Program design features that increase learning

Initial education in Singapore has a strong emphasis on practical skills and student learning. The National Institute of Education (NIE) is the sole provider of initial teacher education in Singapore.[35] Its strength is maintained through its close relationship with the Ministry of Education and schools. Continual feedback, secondments, and joint meetings and partnerships ensure that all are focused on improving school learning.

For example, feedback from the Ministry and schools led the NIE to remove undergraduate electives such as the philosophy and history of education from the initial teacher education course in favour of practical teaching skills.

Other key features include:

- A strong focus on subject content. For example, maths teachers graduate with the same content knowledge as straight mathematics graduates from the National University of Singapore.

- Teachers are recruited and paid as civil servants during their initial teacher education. This is expensive. Yet high retention rates during the course and in the early careers of teaching create significant savings, as well as improving the standard of applicants to the course.

- The financial incentives for NIE focus their activities on continually improving student learning. The Ministry puts a cap on the number of students (thereby increasing competition to get in) and provides substantial funding for school-based research. Importantly, academics at NIE are promoted on their contribution to improving learning in schools, not just on academic papers.

## Implementation

In Korea, reform to the evaluation and development of teacher education courses has improved the quality of initial teacher education. Evaluations now have teeth. A-rated institutions receive substantial financial bonuses. Courses with a D-rating must reduce their student numbers by 50% the following year. Universities have been prompted to invest to improve the quality of teacher education.

The Education Ministry also compels graduates to sit examinations, apart from those they undertake to meet their course requirements, before they become teachers. This is a highly effective mechanism that enables government to influence the quality of teacher education institutions. Those whose graduates do less well at the exam are given a clear signal to lift their game.

*Details of this program and key implementation steps are extensively discussed in the Detailed Analysis Report.*

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[35] NIE is an autonomous research and teaching institute within Nanyang Technological University.

# 8.   School Principal Education

## Program design features that increase learning

In Singapore, school leaders are considered to be vital to school transformation.[36] Leaders are expected to innovate continuously to get the best from their staff and school. Since 2000, an executive education program for principals has helped to help achieve this goal.

Leadership development starts early in the careers of Singapore's educators. Extensive teacher appraisal and feedback is required to identify potential leaders. These leaders therefore do not self-select, but rather are nominated by the Ministry in discussion with schools and principals.

Before undertaking specific education and training, potential leaders are put through extensive interviews and assessments to assess their leadership capabilities.

If they pass these hurdles, they undertake a six-month, full-time *Leaders in Education Program* (LEP). The focus is not on technical administration skills but on leadership and critical self-reflection. It includes a fully sponsored two-week visit to an international educational institution.

Those who do well in the program are matched to particular schools, based on their skills and school needs. The formal leadership program is followed by continuous mentoring, peer group learning, and professional development.

Once in their positions, principals are continuously challenged to improve their personal leadership skills and increase the dynamism of the school education sector. For example, principals are rotated through different schools every 5-8 years, since this is the time period in which they are considered to have a maximum impact on a school.

## Implementation

Feedback loops are crucial in developing school principal education. With input from the Ministry, the NIE shaped its course based on an assessment of the skills, weaknesses and development requirements of existing school principals.

Singapore offers leadership education that includes training in other industries and countries. Flexible career structures and high-quality education and training take leaders out of their comfort zone. The Ministry of Education frequently moves potential leaders to different positions so they can learn in different school environments. Distributing strong school leadership throughout the system raises student expectations and performance.

*The details of this program and key implementation steps are extensively discussed in the Detailed Analysis Report.*

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[36] Ng (2008)

## 9.   Induction and Mentoring

### Learning from the best to become the best

While many systems around the world have induction and mentoring programs, few are done well. Shanghai is the gold standard. Its induction and mentoring programs involve frequent classroom observation with constructive feedback, a practice known to improve student learning.[37]

Mentors and mentees regularly observe each other's lessons, and observe demonstration lessons together. A middle level teacher observes at least one mentor lesson a week.[38] Mentoring focuses squarely on the basics of student learning and teaching, not just on administrative and emotional support. It concentrates on developing core teaching skills such as lesson planning, subject-specific pedagogy, classroom management and research skills.

Unlike other countries, mentoring is for all teachers, not just beginning teachers. It is a key part of a teacher's job description and a requirement for promotion.[39]

Shanghai partly owes its success in mentoring to the intensity with which it is done. Teachers have time and space to meet regularly and reflect on what works and what needs to be improved. Trade-offs in other areas, in particular teaching fewer but larger classes, free up teachers' time for mentoring. They also have

incentives to engage intensively as time spent in mentoring and induction can count toward hourly requirements for professional learning.[40]

Outstanding teachers are promoted and given additional responsibility for mentoring in other schools. Great teachers are not promoted out of the classroom to leadership positions, as they are in other countries. Instead, they are promoted into more classrooms.

In Shanghai's induction programs, beginning teachers learn from different teachers in different settings. They have multiple specialist mentors and learn from senior teachers in research and lesson groups. They model effective practice in demonstration lessons for group feedback and undertake research projects under mentor guidance.

### Implementation

Hong Kong does not have a long-established system of induction and mentoring. But classroom observation and developmental feedback are now expected to be part of induction in all schools.

*The details of this program and key implementation steps are extensively discussed in the Detailed Analysis Report.*

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[37] Hattie (2009)
[38] Gezhi High School, Shanghai documentation
[39] Grattan Institute interview at Shanghai Municipal Education Commission (2011)

[40] Grattan Institute Interview with Shanghai Municipal Education Commission, (2011)

# 10. Research and Lesson Groups

## Teachers do more than teach: they study the best ways to learn

In Shanghai schools, teachers join research groups that study and discuss the best ways for students to learn. They demonstrate how teaching is seen as a research-oriented profession. Teachers are expected to produce research papers of sufficient quality to be published and thereby improve pedagogy throughout the school system.[41] Exemplary groups present research findings in open lessons to other teachers at the District level.  Promotion to advanced and master teacher status requires a candidate to have their published papers reviewed by an expert committee.[42]

At the start of each research project, groups identify a particular aspect of learning. They initially examine theory and evidence, then trial different teaching practices drawing on their findings. In better schools, research reports are published on the findings, creating a record of pedagogical development at each school. The process is also part of teachers' professional learning and factored into promotion.

Both research and lesson groups involve regular classroom observations, followed by constructive feedback. Such collaboration is shown to have significant impacts on student learning.[43] Research and lesson groups are an important part of a

teacher's week. The groups meet between one to two hours a week in some schools. Teachers undertake between six to eight observations per semester in these groups.

In lesson groups, teachers work together to plan lessons, examine student progress, and prepare teaching content. They are central in combating inequality. Students who are falling behind – whose learning needs are not being addressed – are quickly identified and assisted.

## Implementation

Policy makers may feel they need to develop schools' capacity to do research before they seek to introduce research groups into their education system. Singapore provides a study in how to build this capacity. It developed a program to ensure that at least one teacher in every school had the capacity to undertake evidence-based research. He or she would then lead research in the school, and help colleagues to develop their research skills.

*Further details of this program and key implementation steps are discussed in the Detailed Analysis Report.*

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[41] Shanghai research groups are comprised of teachers of the same subject across a school (e.g. maths teachers). Lesson groups involve teachers of the same subject and same year level (e.g. maths teachers of Year 8 students).
[42] Shanghai Municipal Education Commission documentation
[43] Hattie (2009)

# 11. Classroom observation

Constructive feedback based on classroom observation has consistently been shown to have a significant impact on student learning.[44] Feedback creates a culture of exchanging ideas within and among schools.[45]

Teaching is an open profession in the four East Asian systems. Teachers regularly observe their peers. Carefully designed mentoring and teacher evaluation programs make this culture of observation and professional collaboration possible.

## Implementation

Creating classroom observation as a normal part of teachers' daily lives inevitably requires behavioural and cultural shifts in many systems. Hong Kong and Singapore, for example, introduced extensive reforms to build a culture of classroom observation and feedback in schools. Reform required changes to the way schools operated and changes to the job requirements of principals and teachers. Principals must now act to improve classroom observations. Teachers are not only responsible for the learning of their own students, but of all students in their school. They are also responsible to further the professional learning of other teachers.

As a result of these changes, teachers more regularly welcome colleagues into their classrooms. Reform has become self-

sustaining as the school culture encourages demonstration of good practice to others, constructive feedback and reflection.

In Shanghai, lesson observation underpins the functioning of professional learning. Many other programs would not be effective without it. Mentors and mentees regularly observe each other's lessons. Similarly, members of research and lesson groups or professional learning communities observe and support each other as they trial different ways of teaching. Teachers regularly observe exemplary teachers in the school and at District level.

Shanghai even trains teachers in classroom observation. Huang Pu District provides training that emphasises teachers work in teams while observing. Teachers monitor individual student progress over time, and engage in pre- and post- observation discussion. The observing teacher is expected to focus on how the teaching affects the student - not just on the teacher or his or her teaching. Teaching should always be observed through the lens of improving student learning.

*The details of this program and key implementation steps are extensively discussed in the Detailed Analysis Report.*

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[44] Hattie (2009)
[45] Blackwell and McClean (1996), Munson (1998)

## 12. Teachers' career structures

Since 2000, reforms have been introduced in Singapore to increase teachers' pay and status, create a comprehensive system of teacher appraisal, and tie it to meaningful professional learning.

These reforms have had a substantial impact. Teacher attrition rates, which were rising, are now consistently less than one-third of the rate in the rest of the public service.[46] A new career structure has developed specialist teaching, education and leadership skills. Importantly, good teachers are no longer 'promoted out of the classroom'. Instead, they are effectively promoted into more classrooms by playing an extensive developmental role across the system.

Teachers in Singapore can now follow different career tracks: Senior Specialist (teachers with high-level specific skills and education knowledge), Leadership, and Teaching.[47]

Advancement within and between tracks is determined by the teacher's individual performance and potential, as measured by an Enhanced Performance Management System (EPMS), and by each school's needs.[48]

The EPMS is a performance management system that has both evaluative and developmental roles. It includes extensive planning of teachers' activities, frequent coaching and mentoring, reflection and feedback.[49] It is strongly linked to professional learning and teacher pay. Each teacher, leader and specialist is given a grade (from A-E) after an end-of-year review. High performers receive bonus payments.

### Implementation

Reforming career structures is never easy. Singapore provides a model for how to change a profession and overcome the fears and resistance that can accompany changes to performance management and pay structures. Implementation steps included:

- Clearly identifying problems with the old system and articulating how they would be addressed

- Extensive dialogue and engagement throughout the reform process

- Sequencing of reforms (for example, bonus payments were delayed until after the performance management system was in place)

- Comprehensive and sustained capacity building in schools, including ongoing training for senior teachers, and seminars for new teachers.

The reform continues to evolve in response to feedback from teachers, schools and other stakeholders.

*The details of this program and key implementation steps are extensively discussed in the Detailed Analysis Report.*

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[46] Grattan Institute interview with Ministry of Education, Singapore, (2011)
[47] OECD (2009b)
[48] Ibid.

[49] Grattan Institute interview with Ministry of Education, Singapore, (2011)

# 13. Appendix A: Sample PISA question

*Sample Science Question: [50]*

Imagine that you live near a large chemical factory that produces fertilisers for use in agriculture. In recent years there have been several cases of people in the area suffering from long-term breathing problems. Many local people believe that these symptoms are caused by the emission of toxic fumes from the nearby chemical fertiliser factory. A public meeting was held to discuss the potential dangers of the chemical factory to the health of local residents. Scientists made the following statements at the meeting.

Statement by scientists working for the chemical company:

*"We have made a study of the toxicity of soil in the local area. We have found no evidence of toxic chemicals in the samples we have taken."*

Statement by scientists working for concerned citizens in the local community:

*"We have looked at the number of cases of long-term breathing problems in the local area and compared this with the number of cases in an area far away from the chemical factory. There are more incidents in the area close to the chemical factory."*

Question: The owner of the chemical factory used the statement of the scientists working for the company to argue that "*the emission fumes from the factory are not a health risk to local residents*". Give one reason, other than the statement by scientists working for the concerned citizens, for doubting that the statement by scientists working for the

company supports the owner's argument.

Answer: An appropriate reason is given for doubting that the statement supports the owner's argument, such as:
- The substance causing the breathing problems may not have been recognised as toxic.
- Breathing problems may have been caused only when chemicals were in the air, not in the soil
- The samples may not be representative.
- The scientists are being paid by the company.

*Sample Maths Question*

In Zealand, opinion polls were conducted to find out the level of support for the President in the forthcoming election. Four newspaper publishers did separate nationwide polls:
- Newspaper 1: 36.5% (poll conducted Jan 6, sample of 500 randomly selected citizens with voting rights)
- Newspaper 2: 41.0% (poll conducted on Jan 20, sample of 500 randomly selected citizens with voting rights)
- Newspaper 3: 39.0% (poll conducted on Jan 20, sample of 1000 randomly selected citizens with voting rights)
- Newspaper 4: 44.5% (poll conducted on Jan 20, with 1000 readers phoning in to vote).

**Question:** Which newspaper's result is likely to be the best for predicting the level of support for the President if the election is held on January 25? Give two reasons to support your answer.

**Answer**: Newspaper 3. The poll is more recent, has a larger sample size, a random sample, and only voters were asked.

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[50] http://www.oecd.org/document/31/0,3746,en_32252351_32236191_41942687_1_1_1_1,00&&en-USS_01DBC.html#Vol_1_and_2

## 14. Appendix B: Learning from the Best: A Grattan Institute Roundtable on education systems in East Asia

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Mr Tony Mackay, Asia Education Foundation

### International participants

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Professor Tan Oon Seng, Dean - Teacher Education, National Institute of Education, Singapore

Dr Yu Hyunsook, Director-General, Korean Educational Development Institute (KEDI), Republic of Korea

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Ms Janet Davy, Group Manager, Department of Education and Workplace Relations

Mr Stephen Elder, Director of Catholic Education, Catholic Education Office - Archdiocese of Melbourne

Ms Margery Evans, Chief Executive Officer, Australian Institute for Teaching and School Leadership

Ms Liz Forsyth, Partner, Government Advisory Services, KPMG

The Hon. Julia Gillard PM, The Prime Minister of Australia

The Hon Peter Garrett MP, Federal Minister for Education

Ms Julie Grantham, Director General for Education, Department of Education and Training, Queensland

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Ms Maxine McKew, Social Ventures Australia

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Ms Lisa Paul, Secretary, Department of Education and Workplace Relations

Ms Kym Peake, Deputy Secretary, Skills Victoria

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