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Catching up:

Learning from the best school systems in East Asia

Ben Jensen

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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 the 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, there is scope to learn from its most effective school systems about reforms to improve children's lives.

Success in high-performing education systems in East Asia 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 structures of East Asia can or should be reproduced elsewhere. Each country has to tailor reform to its own system and culture.

However, Hong Kong, Shanghai, Korea and Singapore all 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 countries are trying to embed. Yet there is often a disconnect between policy objectives 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.

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1. How we wrote this report, how to read it

In September, 2011, Grattan Institute 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 Federal Minister for School Education, Early Childhood and Youth, 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 this report.

There are two reports on this research, the Summary report and Full report. While Chapters 2 to 4 are similar in both reports, the Full report provides substantially more detail in Chapters 5 to 12 on how the high-performing education systems in East Asia designed and delivered their policies and programs.

Chapter 5 considers the theory of successful education reform: the need to define a system-wide strategy and to ensure that it is implemented at the lowest but most important level of the school system: the classroom.

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 that have been integral to the success of one or several of the high-performing education systems in East Asia: initial teacher education, school principal education, induction and mentoring, classroom observation, research and lesson groups, and teacher career structures.

No country can import another's culture, but these six programs have been the focus of reform in many systems throughout the world. Reform in high-performing systems in East Asia has an unrelenting focus on improving student learning. An objective to which all school systems aspire.

While the findings of the Summary report should interest all people with a stake in education, we also hope the extensive material on education strategy, design and implementation of effective programs in this Full report will assist educators and policymakers undertaking the practical 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:

- Prime Minister of Australia, The Hon. Julia Gillard MP;
- Australia's Federal Minister for School Education, Early Childhood and Youth, the Hon. Peter Garrett AM, MP;
- Professor Cheng Kai-Ming, Chair Professor of Education, the University of Hong Kong, Hong Kong Special Administrative Region;
- Dr Andreas Schleicher, Special Advisor on Education Policy to the OECD Secretary-General and Deputy Director, OECD Directorate for Education;
- Dr Shin Hye-Sook, Research Fellow, Korean Educational Development Institute;
- Professor Tan Oon-Seng, Dean – Teacher Education, National Institute of Education, Singapore;
- Dr Zhang Minxuan, President, Shanghai Normal University;
- 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; and
- 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: Centre for Public Education, Hay Group, KPMG, and Social Ventures Australia.

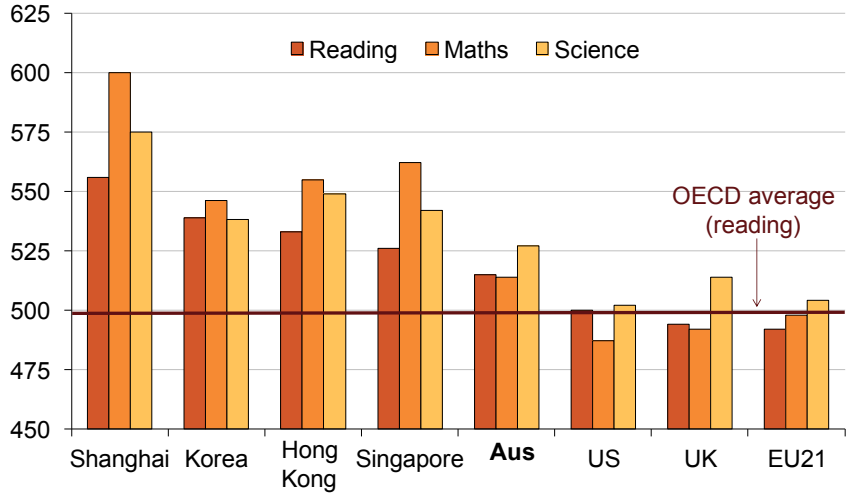
The Roundtable was presented in association with Asialink and Asia Education Foundation, and the Department of Education and Early Childhood Development, State Government of Victoria.

For a full list of participants see Appendix A.

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 (see Figure 1).

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, on average, above his or her counterpart in Australia, the US, the UK in EU21 countries.[1]

Korean students are at least a year ahead, on average, of USA and EU students and seven months ahead of Australian students in reading. Hong Kong and Singaporean students are, on average, at least a year ahead of the USA and EU students in science (see Figure 2).

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	12	18	11	13	17	14	6	12	7
Singapore	8	22	13	10	20	9	10	19	12	3	14	5
Korea	12	17	11	14	16	8	14	14	11	7	9	3

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

*Notes: * Unweighted average. Figures represent the difference in PISA 2009 performance expressed in the number of months of school education. One school year corresponds to 39 points in reading, 41 points in maths and 38 points in science, on average, across OECD countries on the PISA scale.*

Source: PISA 2009 data from (OECD, 2010b), conversion rate of PISA points to OECD education months from Thomson, et al. (2010)

[1] This should be interpreted as two to three 'OECD years' of education. PISA points are converted to education months, on average, across OECD countries on the PISA scale. Conversion rate sourced from Thomson, et al. (2010).

Box 2.1: How are students assessed in PISA?

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

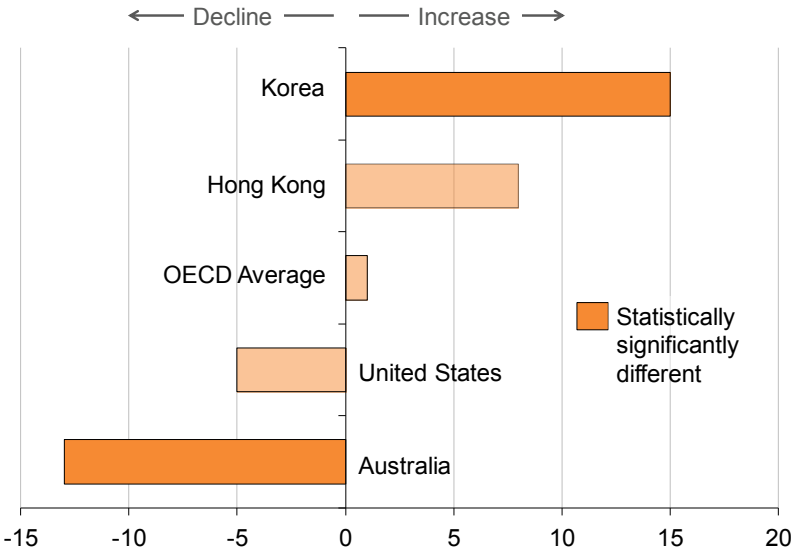
PISA tests are designed to capture how well students are equipped to apply academic skills in real-world situations. "The emphasis is on mastering processes, understanding concepts and functioning in various contexts."[2] Students are asked to compose long-form answers, as well as answer multiple-choice questions. Both parts assess problem-solving skills.

2.1.1 High performance that keeps improving

Improvement in performance in high-performing education systems in East Asia has been rapid (see Figure 3). For example:

- Between 2000 and 2009, Korea's mean reading score improved by 15 points (equivalent to nearly fivemonths learning), on top of decades of improvement. Hong Kong improved by eight points.
- Shanghai and Singapore participated in PISA for the first time in 2009 and ranked 1st and 5th in mean reading scores of countries tested.[3]
- 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.[4]

Figure 3: Change in PISA mean reading scores: 2000-2009



Source: (OECD, 2010a)

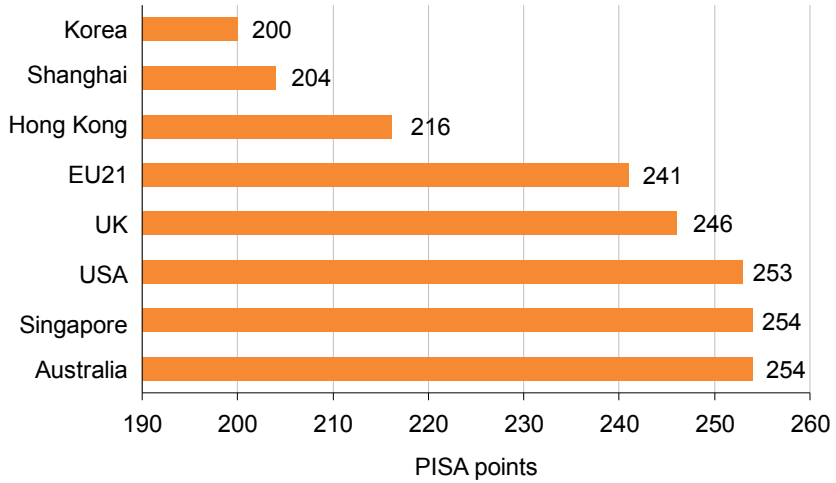
[2] OECD (2010b)
[3] Ibid.
[4] Mullis, *et al.* (2007)

2.1.2 High levels of equity

High-performing education systems in East Asia 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.[5]

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)

[5] 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.[6]

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.[7]

2.1.4 High Efficiency

The world's best school systems are rarely the world's biggest spenders (see Table 1).[8] 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%.[9] The average cost of non-government school fees rose by 25%.[10] Despite these increases, Australia was only one of four

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

countries that recorded a statistically significant decrease in PISA reading scores from 2000 to 2009.[11]

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

Note: 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, 2011b)

[11] OECD (2009a) Figure V.2.1

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. High performance in education systems in East Asia 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.

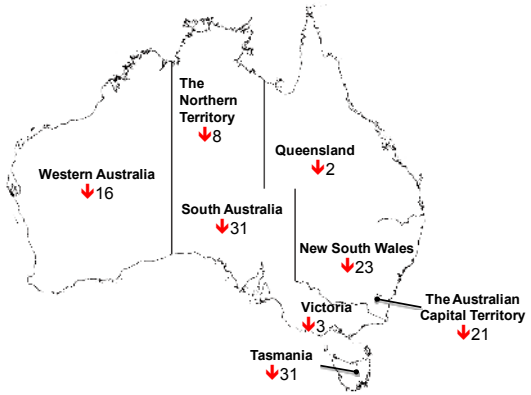
Success cannot be explained by rote learning, either. PISA assesses meta-cognitive content knowledge and problem solving abilities. These skills are not conducive to rote learning. In fact, rote learning in preparation for PISA assessment would lead to lower scores (see Appendix B for examples of questions 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.[12]

Success is also not driven by the size of the system (see Table 2 and Figure 5). The four high-performing education systems in East Asia vary in size. Korea is much larger than Hong Kong and Shanghai and has more than 30 times the number of schools as Singapore.

Table 2: Size of East Asian education systems

	Shanghai[13]	Korea[14]	Hong Kong[15]	Singapore[16]
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

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



Source: (Thomson et al., 2010)

[12] US Department of Education National Center for Education Statistics (2003)

[13] Excludes special schools. Shanghai Education Commission (2011)
[14] Includes vocational high schools, excludes special schools.
[15] Education Bureau (2011f), Education Bureau (2011g)
[16] Excluding Junior college/centralised institutes, pre-university education. Ministry of Education (2011).

There is growing global agreement on what works in schools

A body of international research has identified the common characteristics of high-performing education systems.[17] They:

- Pay attention to what works and what doesn't. 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.

High-performing education systems in East Asia are implementing what works

The 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 teacher education. In Korea, 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 continuously 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

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

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.[18]

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.[19]

High-performing education systems in East Asia 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 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. Activities include preparing for lessons, teacher collaboration, classroom observation and giving feedback.

By contrast, Australian teachers have only half as much time for such activities. And American teachers have only 12 minutes between each class to concentrate on the activities that are so important in high-performing education systems in East Asia (see Figure 6).[20]

[18] OECD (2009b)
[19] OECD (2005)

[20] Grattan analysis assumes 45 minute classes and a 38-hour working week.

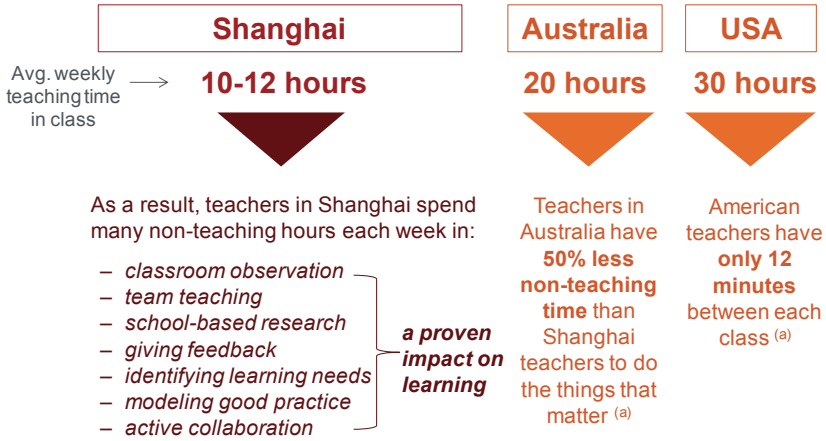
Table 3: Average weekly teaching time and class size

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

Notes: *(a) Public schools only. 'Teaching hours' are hours that a teacher teaches a group or class of students. (b) Public schools only, lower secondary education*

Source: *(OECD, 2011b) Education at a Glance: Table D4.1, Table D2.1. *Grattan Institute interview with Shanghai Municipal Education Commission, 2011; † Hong Kong Education Bureau (secondary), β Department for Education (England), Statistical First Release (2011).*

Figure 6: Helping teachers focus on what matters: average time spent teaching per week in Shanghai, United States and Australia



Note: (a) assumes 45 minute classes and a 38 hour working week.

4. What is effective learning and teaching?

Each of the high-performing education systems in East Asia have undertaken a deep analysis of learning and teaching and where it should be. For example, at the start of their reforms Hong Kong began with a 20-month investigation of the current state of learning and then mapped 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 decisions should be based on evidence of what works in the classroom.[21]

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,[22] and, school and classroom climate.[23]

The evidence shows that these are universal qualities of good teaching, and improve student learning.[24] 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.

[21] Barber and Mourshed (2007)

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

5. Connecting policy to classroom learning

High-performing education systems in East Asia succeeded in connecting policies to improve effective learning and teaching to what hapopens in schools and classrooms. What are the keys to effective implementation? This chapter will show how they selected the right interventions, and then used a coordinated range of techniques to change behaviours.

Hong Kong's *Learning for Life, Learning through Life* is a shining example of a comprehensive education reform strategy document. Twelve years since it was published, in 2000, it is still being used to guide reform in Hong Kong. What explains its longevity? First, a clear articulation of the strategic objective to improve learning (and the complexities of doing so). Second, an unrelenting focus on implementation. *Learning for Life* reads as much like an implementation plan as a strategy document. The goal is always maximum impact in classrooms.

5.1 Selecting interventions

To achieve their policy aims, high-performing education systems in East Asia studied selected their interventions carefully. Their primary goal was improved learning. They looked for interventions where there was strong evidence they would succeed. They set priorities so that there were fewer interventions, and they used a deliberate mix of "push" and "pull" interventions (defined in section 5.1.3) to improve and monitor the input in classrooms.

5.1.1 Improved learning as the primary goal

Successful systems evaluated potential interventions by asking how they would affect learning. For example, the Hong Kong reforms "very clearly focussed on the 'core business of learning'".[25]

The key criterion here is learning, not teaching. The difference is subtle, but important. As Figure 7 shows, a focus on learning changes the frame. It puts greater focus on assessing student learning outcomes rather than assessing teachers.[26]

This reframing leads to important changes in emphasis. In initial teacher education, for example, if the focus is on teachers, then policy makers (and the broader education debate) are more likely to focus on the qualifications of teachers, regardless of the impact of various (or additional) qualifications on student learning. A focus on learning shifts the emphasis to initial teacher education courses and how, and to what extent, they influence learning in schools.

In Singapore, this approach 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, school principals, and the Ministry of Education showed that these subjects were not leading to sufficient increases in students' learning. Instead NIE focused more on subjects emphasising practical classroom teaching. Similarly, in many systems, problems of underperformance still

[25] Cheng Kai-Ming, Grattan Institute Roundtable
[26] Jensen and Reichl (2011)

focus on under-performing teachers.[27] Policy debates become centred on how to measure teacher effectiveness and teacher dismissal procedures. In contrast, a focus on learning leads to programs to improve learning in under-performing schools through better assessment and observation, constructive feedback, professional collaboration, and professional learning that are all targeted at the student – not the teacher.

None of the high-performing education systems in East Asia focus their policies on making it easier to dismiss under-performing teachers. This does not mean there is no accountability, or that performance expectations and requirements are not high. In fact, they all have comprehensive systems of teacher appraisal and performance management that include strong horizontal accountability (see Chapter 12 for further discussion).

5.1.2 Setting priorities

Successful implementation also depends on careful prioritisation. It is resource intensive, which requires difficult decisions in allocating resources between programs. Financial resources are always scarce, yet are relatively visible. Less visibly, management time, teacher time, and teacher capacity for change are also scarce resources. The lack of correlation between financial resources and 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.

[27] Ibid.

Figure 7: Connecting education policies to classrooms: Programs that focus on learning, not teachers or teaching

Programs	Teachers	Teaching	Learning
Initial teacher education (Ch.7)	• Number of applicants and graduates • Qualifications	• Course content: broad focus on education • Teaching skills of graduates	• Feedback from schools on course content that improves learning • Teachers are researchers that continously improve student learning
School principal education (Ch 8)	• Traditional management and administration	• Instructional leadership that sets curriculum and professional development	• Lead behavioural and cultural change that continuously improves learning and teaching
Induction and mentoring (Ch.9)	• Familiarisation with school administrative processes and emotional support • Sharing experience of teaching • Passing probationary phase	• Curriculum preparation and lesson plans • Advice on appropriate teaching techniques	• Constructive feedback based on frequent classroom observation • Multiple specialist mentors • Mentees observe mentor's classes • Developing new teachers as researchers
Research and lesson groups (Ch.10)	• Teachers meet in groups and networks in and between schools	• Teachers exchange materials and coordinate timetabling and homework	• Active professional collaboration, team teaching, classroom observation and feedback • Constant monitoring and feedback on each students' progress • Teachers are researchers who lead reform and implement new pedagogy
Classroom observations (Ch.11)	• Observation to fulfil requirements for teacher evaluation	• Feedback focuses on how teachers interact with the class	• Feedback focuses on students' learning, progress and individual needs
Teacher career structures (Ch.12)	• All teachers have similar classroom teaching responsibilities • Promotion based on tenure • Dismissal process for underperforming teachers	• Effective teachers promoted to more curriculum and administrative responsibilities • Professional development for underperforming teachers	• Teachers that improve student learning promoted into more classrooms by developing other teachers • Continual appraisal and feedback that improves student learning

5.1.3 A mix of "push" and "pull"

An effective strategy maps how each policy and program impacts learning and teaching in the classroom. Reforms that affect learning and teaching can be separated into:

- Push reforms that propel: they generate momentum for change by providing educators with new content and support to improve current practice; and
- Pull reforms that compel: they create imperatives for change by setting new standards and outcomes that educators and students must reach.

Examples of push reforms include curriculum reform and teacher development and support. Pull reforms include reform to student assessments and various accountability arrangements. Assessments, expectations for students, schools and teachers, and accountability arrangements should all 'pull' learning and teaching in the classroom towards the strategic objective.

Both push and pull reforms should take teaching and learning in the same direction. All reforms should be based on a detailed analysis of how they push and pull learning and teaching, identifying how they interact in the classroom.

To find the right policy balance, it is imperative to map the impact of each reform on the push and pull of learning and teaching. Doing so ensures that:

- Each reform is designed and evaluated on its impact on classroom learning and teaching;
- Policies are not implemented that have a negative impact on classroom learning and teaching;
- The impact of the interaction of policies is identified. The policy mix needs to be continually monitored and altered to achieve the best impact on learning and teaching;
- Learning and teaching stay at the front of education policy.

The right reform mix in one system may not work in another if the starting point differs substantially. Some systems may already have significant push or pull factors that need to be balanced.

Box 5.1: Push and pull: not the same as top-down and bottom-up

For some, mapping the push and pull on learning and teaching echoes discussions of bottom-up and top-down policy approaches.[28] But there are substantial differences. First is the difference in focus. Decisions on bottom-up and top-down approaches are about governance: who decides. Governance is important, but should not be the focus of education strategy. Learning should be the focus and the behavioural changes in teaching and pedagogy required to reach learning objectives. A focus on governance takes policy out of the classroom and shifts the discussion away from effective implementation.

Second, applying a top-down and bottom-up framework is limiting. It narrows the design of policies and programs and can result in a governance structure being applied that restricts how policies can operate. For example, accountability arrangements are a clear 'pull' on learning and teaching. If accountability programs were considered as top-down policy their application would be restricted and the benefits of horizontal accountability ignored. Teachers appraising and providing feedback and observing each other's classes are integral to accountability in each of the high-performing education systems in East Asia. Horizontal accountability provides a clear pull on teaching and learning, but is not a top-down program.

5.2 Changing behaviours

Implementation plans in high-performing education systems in East Asia all assumed, explicitly or implicitly, that their primary aim was behaviour change. It is axiomatic that learning and teaching will not improve unless principals, teachers and students change their behaviour. 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:[29]

- 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 the growing body of evidence about what makes for successful implementation of education reform. It draws on experiences in England (1997-

[28] Hopkins and Fraser (2011)

[29] Lawson and Price (2003)

2002), Ontario (1997-2002) and comparative international work.[30] In this literature, successful implementation depends firstly on a coherent strategy, based on:

- Assessment and understanding of the system;
- A small number of ambitious goals; and
- Sequencing and integration of interventions to display an internal coherence.

It is important to consider these factors in reform in high-performing education systems in East Asia.

- Purpose
  - Effective communication, particularly of key messages, that secured the engagement and commitment of the teaching profession, and ongoing support from the public.
- Role models
  - Strong and resolute leadership at all levels of the education system.
  - Leadership that managed distractions to reforms and maintained focus on the end goal of reforms.
- Skills
  - Review and prioritisation of resources to build capacity for the new behaviours.
- Reinforcement systems
  - Transparent implementation that held all stakeholders (including government) accountable.

5.3 Political will

Careful prioritisation and an implementation plan to change behaviours 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 who may seek to preserve their own situation or interests even when they may not serve their institution's goals.[31] Whether these forces prevent well-designed implementation fundamentally depends on the political will for change.

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

[31] Levin (2008)

Box 5.2: A focus on student learning increases the status of teachers

A focus on student learning, rather than on teachers, increases the status of teachers as it highlights the complexity of learning and teaching.

To focus on learning requires a much greater understanding of the complexities of children's learning (and learning theory). In turn, this understanding highlights the inherent complexity of teaching and the skills required to meet each student's different learning needs (normally simulataneously). This elevates the role of teachers to high-level research practioners.

Teachers' initial education, professional learning, and career structure can all be shaped to emphasise high-level research by teachers. Teachers must be able to design and evaluate school-based research to improve learning in schools. For example, the first step in the promotion process to become an *Advanced Teacher* in Shanghai is for the teacher to have one of their published papers reviewed by an expert committee.

Teacher status is high in high-performing education systems in East Asia, not because teaching is difficult or stressful, but because it is complex, requiring theory and practice to be brought together by true professionals.

6. Best practice reform: Hong Kong

Highlights

Successful policy involves 20% design and 80% implementation.

- Hong Kong's strategic objective was to improve student learning by improving teaching. A focus on learning places strategy in the classroom, highlighting the importance of implementation.

Hong Kong used whole-system implementation to achieve successful reform:

- Whole-system implementation views each element of an education system as an implementation tool for a given policy lever.
- For example, reform of curriculum and student assessments were implementation tools for the policy lever of improving teaching.

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.

Hong Kong provides a leading example of successful education strategy and implementation. This chapter illustrates how Hong Kong enacted successful reform to their education system over a 12-year period using a 'whole-system implementation' approach. A brief overview of the scope of the reforms is first discussed, followed by a discussion of key aspects of strategy and implementation following four education strategy steps:

1. Improving learning: Choosing a strategic objective(s)
2. Reforming teaching to improve learning: Prioritising policy levers
3. Implementation
4. Allocating resources (and continually reallocating following continual feedback and evaluation)

A brief overview of reform in Hong Kong

Hong Kong provides a leading example of successful education strategy and implementation. The scope and scale of the reforms cannot be overstated. Since the start of this century, Hong Kong

has implemented reform to every level of education: kindergarten, primary school, junior and senior secondary school, university and life-long learning opportunities.

Hong Kong's reforms were designed around one central objective: to improve student learning. The main policy lever to enact reform was to improve teaching and pedagogy.

Reform required changes to teaching and improvements in pedagogy. As shown in Figure 8 reform also included:

- A new academic structure including reforming the old British structure to 3 years of senior secondary school plus 4 year undergraduate degrees. The opportunity was created for more students to complete senior secondary school and apply for university education.
- New curriculum for school education including basic education (primary and junior secondary) and senior secondary school.
- New assessment mechanisms including the assessment for learning (or formative assessment), introduction of school-based assessment to reduce the reliance on examinations and the introduction of new assessment rubrics for senior secondary school subjects.
- Improved interfaces between different education stages, including reforming the student admission systems for primary and secondary schools, as well as changes to university admission criteria.

The review of the education system resulted in Hong Kong's two strategy documents: the overall strategic document *Learning for Life, Learning Through Life* and the curriculum reform document *Learning to Learn – The Way Forward in Curriculum*. Both documents are so detailed and precise they read like implementation plans. They recognise that changes to learning and teaching can only happen when they are implemented by every teacher, in every classroom.

Implementation of the strategy began in 2000 and will not fully conclude until 2016 when the first cohort of students graduate from the new four-year undergraduate degrees. Through the past 12 years, Hong Kong authorities have stuck with these plans. They have outlived many education policy documents around the world.[32]

[32] Grattan Institute interview at Hong Kong Education Bureau (2011)

Figure 8: Reform in Hong Kong: 1999-2012

Early childhood education

Single regulatory authority for kindergartens and childcare

Quality assurance

- New set of self-evaluation indicators
- Introduction of external inspections

Enhancing professional competence

- Raised entry requirements for teacher qualifications
- Increased training requirements for new supervisors

Lowered kinder age

Review of financing

Improved interface between early childhood and primary education

School education

Structural reform

- New senior secondary academic structure (three years)
- Reforms to primary and secondary student allocation systems
- 'Through-train' schools linking primary and secondary

Curriculum and pedagogy reform

- New curriculum framework: integrated key learning areas, five essential learning experiences, new core subjects, new teaching strategies and diversified teaching materials to improve student learning
- School-based curriculum development including curriculum leaders
- New teacher competency framework and continuing professional development requirements
- Minimum standards for mentoring and induction

Assessment reform

- Abolition of high-stakes exams for student allocation systems
- Introduction of low-stakes competency assessments
- Introduction of 'assessment for learning' or formative assessment
- Broader range of assessment mechanisms
- New senior secondary assessment rubrics and final year exam

School based management reform

Languages education reform

- Motivating languages environment, promotion of reading
- Medium of instruction reforms

Higher Education

Structural reform

- Undergraduate degrees extended to four years
- Establishment of community colleges

Reform university admission system

- Broaden admission criteria to consider students' all-round performance
- Increase opportunities for post-secondary education
- Transfer credit system

Curriculum reform

- Review functions, contents of first year degree programs to expand the breadth and depth

Teacher training reviews

- Review training for early childhood and primary teachers
- Review teacher training to incorporate pedagogy, curriculum and assessment reforms

Continuing education

- Establish alternative avenues of continuing education

Step 1: A strategy to improve learning

Hong Kong's reforms were designed around one central objective: to improve student learning. Hong Kong undertook a review of their entire education system within the context of reunification with China and a shifting global economy. They wanted their students to develop skills to meet new challenges in a knowledge economy. The process began with a 20-month strategy development and consultation phase in which reforms were designed and implementation planned.

Strategy development included an in-depth analysis of student learning. An initial analysis of the education system identified that students' learning was very exam driven, monotonous and provided little room to 'think, explore and create'.[33] Teaching had become a one-way transmission process and student learning had become more passive.[34] In contrast, Hong Kong wanted its students to be capable of constructing knowledge with '…life-long learning, critical and exploratory thinking, innovating and adapting to change.'[35] It wanted children to enjoy learning, to improve their communication skills and to develop their creativity.[36]

Through the analysis, a definition of what constituted student learning in Hong Kong was produced: students engaging with learning activities, building on what they know, interacting, creating and exploring new knowledge.[37]

[33] Education Commission (2000)
[34] Curriculum Development Council (2000)
[35] Ibid.
[36] Education Commission (2000)
[37] Ibid.

Hong Kong's new definition of learning was a shift from its previous understanding of learning as 'knowledge acquisition'.[38] This shift allowed Hong Kong to map the difference between what student learning had been previously and what Hong Kong wanted it to become.

Box 6.1: Developing 21st century skills

Hong Kong's shift towards an education system that helps students develop 21st century skills provides an example for other education systems moving in this direction. Many educators are developing and implementing pedagogy, curriculum and assessment changes that help develop 21st century skills.[39] Research by the OECD in 2009 found that while many countries have regulations, guidelines and recommendations for developing 21st century skills, many systems lack definitions of the skills, as well as formative and summative assessment mechanisms.[40] Hong Kong provides an example of how these changes can be implemented.

Due to the detail, comprehensive consultation and structured development steps, the analysis:

- Described where learning is and where it should be (the strategic objective);
- Painted a detailed picture of what was needed from policy levers to increase learning; and

[38] Grattan Institute interview at Hong Kong Education Bureau (2011)
[39] For example, Cisco/Intel/Microsoft assessment and teaching of 21st century skills: www.atc21s.org
[40] Ananiadou and Claro (2009)

- Provided a clear and convincing rationale for reform. Hong Kong was improving learning to prepare their students for the future.

The review of the education system resulted in a long-term and detailed strategy and implementation plan to deliver reform. Hong Kong have stuck with the plans over ten years, implementing reforms with precision and fidelity. Implementation of the whole strategy commenced in 2002 and will not be fully implemented until 2016 when the first cohort of students graduate from the new four-year undergraduate degrees.

Group of champions

Strong leaders from politics, government, business and academia - who all believed in the need for education reform - communicated the rationale for reform and helped develop community consensus for both reform and its implementation. Hong Kong's strategy was not always popular with all stakeholders, yet these leaders made difficult decisions to implement reform to improve the system.

> *You need 'decisive leaders making decisions at the right time'*
>
> *– Catherine KK Chan, Deputy Secretary, Hong Kong Education Bureau, Hong Kong Special Administrative Region*

The broader community now acknowledges that learning does not only occur in schools and classrooms. Teachers are encouraged to facilitate learning in other contexts to help students develop skills in the real world. Business leaders, community groups and government departments help facilitate these experiences. Extensive efforts are made to ensure that parents understand the range of learning and teaching styles that will increase their child's learning.

Step 2: Reforming teaching to improve learning

Hong Kong identified that improving teaching would have the single biggest impact on improving student learning in its system.

To develop effective policy and implementation, a deep analysis of the state of teaching and pedagogy in Hong Kong revealed the behavioural and cultural changes required to take teaching and pedagogy from the current situation to where they should be.

By analysing and defining learning in its education system, Hong Kong recognised the complexity of learning and therefore the complexity of teaching. It could then assess the type of teaching that was needed to improve student learning.

Box 6.2: What is a policy lever?

- A policy lever is an element or characteristic of a system that can be changed in order to achieve a strategic objective.
- Each policy lever must positively impact the strategic objective – there is no point in changing a system if it does not help achieve goals.
- Policy levers must be prioritised to have the largest impact on the strategic objective. The choice of policy levers affects the sequencing of implementation and allocation of resources.

Analysis of the current state of teaching and pedagogy showed that teaching was based on a direct transmission approach – teachers delivering or transmitting knowledge to students who are passive learners. Students were expected to acquire knowledge (as opposed to skills) through monotonous and repetitive tasks that required little independent, critical or creative thought, nor problem solving skills. Teaching had become monotonous. Teachers relied too much on textbooks to deliver a subject syllabus.

Hong Kong wanted its teaching to move:

- From knowledge transmission to helping students learn how to learn, including using a constructivist approach and enquiry-based learning to help students develop skills;
- From over-emphasising purely academic studies to helping students develop a broad range of skills; and
- From a sole focus on textbooks to delivering a syllabus to using diversified learning and teaching materials to deliver a broader curriculum.[41]

As a result of Hong Kong's reforms, the broader community developed a new understanding of learning and therefore of teaching. Teachers now understand that teaching is a learning profession. Schools and teachers are focused on the process of improving learning rather than transmitting knowledge.

Understanding barriers to cultural change

Hong Kong recognised that substantial reform to teaching would require significant behavioural and cultural change - a potentially serious obstacle to the success of the reforms.

Hard-working teachers are a strength of Hong Kong's system.[42] Hong Kong recognised that as the frontline workers responsible for implementing reforms in schools and classrooms, [43] teachers needed additional support to develop the capacity to implement change.[44] Many elements of the reform supported teachers to implement major curriculum, assessment and pedagogy changes in their classrooms (discussed below). New professional development programs and workshops, matched to the reform's implementation timeline, prepared teachers for the changes.

[41] Education Commission (2000)
[42] Grattan Institute interview at Hong Kong Education Bureau (2011)
[43] Education Commission (2003)
[44] Implementation of whole-system reform implies adaptation on behalf of the teaching profession. This can only occur through engagement, collaboration and participation of all stakeholders in the education system. Levin (2010)

"Teachers prefer support rather than holding them accountable."

– Dr Cheung Kwok-Wah, Principal Assistant Secretary (Curriculum Development), Hong Kong Education Bureau, Hong Kong Special Administrative Region.

Hong Kong acknowledged the strengths of its system: the high value that parents and the community place on education and the strong culture of academic excellence and high expectations.[45] In order to use these strengths, Hong Kong sought to get parents behind the implementation of reforms. Parents were encouraged to maintain close communication with teachers regarding their child's learning needs, to encourage lifelong learning among students, and to become involved in the school community.[46]

Hong Kong identified that its old system placed too much value on exam results. As a result, students prepared through monotonous tasks and drilling. Little attention was paid to developing other skills or 'learning to learn'. In response, a number of high stakes public exams were removed and four inter-connected 'key tasks', designed to help students develop independent learning capabilities, were developed. The key tasks also broaden the pedagogy used to engage students.[47] These tasks are moral and civic education, reading to learn, project based learning and IT for interactive learning.

Box 6.3: Pedagogy changes in Hong Kong

The central tenet of Hong Kong's reform was to improve pedagogy in order to improve student learning. These changes included:

- Broad learning experiences, including project and enquiry-based learning, 'reading to learn' and the use of interactive technology in the classroom to help students develop their critical thinking, problem solving and communication skills. The change in pedagogy was a shift from teachers transmitting knowledge through meaningless drilling to passive students in the classroom.
- Diversified learning and teaching materials rather than a focus on textbooks to deliver curriculum.
- Formative assessment, informing teachers how their students learn best (and to adjust their pedagogy accordingly) rather than solely using exams to judge students' knowledge acquisition. Teachers now use a range of different assessment mechanisms to assess skills that cannot be observed in pencil and paper tests.
- Integrated learning areas across the curriculum instead of compartmentalised subjects.
- Developing learning skills rather than purely academic knowledge.
- Learning experiences in the broader community compared to learning confined to the classroom.

[45] Grattan Institute interview at Hong Kong Education Bureau (2011)
[46] Curriculum Development Council (2000)
[47] Ibid.

Step 3: Implementation

Detailed implementation planning characterises Hong Kong's success in education reform. Hong Kong undertook its implementation planning simultaneously with its strategy design; one process was not separated from the other. The focus throughout was how to implement the reforms in schools and classrooms to increase learning.

> *"There is a high degree of coherence in their strategy – over time, across the system, and they implement with a high degree of precision."*
>
> *- Dr Andreas Schleicher, Special Advisor on Education Policy to the OECD Secretary-General and Deputy Director, OECD Directorate for Education*

Detailed and precise processes produce better results than high-level goals and mission statements. The detail contained in Hong Kong's strategy and implementation planning gave those implementing policy concrete and detailed actions to undertake. Throughout the strategy development, actions and supporting measures to implement reforms in classrooms were identified (and the timeframes by which they needed to be implemented). Each part of the reform was broken into sub tasks with supporting measures and timeframes for implementation detailed. Across six areas of reform,[48] the Education Commission identified 42 supporting measures for teachers, schools and the education system to implement reforms.

> *"Successful policy involves 20% design and 80% implementation"*
>
> *- Mrs Fanny Law, Former Permanent Secretary, Hong Kong Education Bureau, Hong Kong Special Administrative Region*

As a result of upfront implementation planning in the education strategy, the steps required for implementation were very clear. The rationale for each step in the reform process was articulated carefully and responsibility allocated accordingly. Further, very specific timelines were detailed for implementation: short-term, medium-term and long-term goals.[49] Every stakeholder was aware of what would take place, why and over what timeframe.

[48] These areas include: enhance the professional standard of principals and teachers, measures for enhancing the performances of high and low-achievers, promoting parental education and home-school cooperation, school-based management, quality assurance mechanisms and promoting the operation of a regional/territory-wide communication network and optimise the use of regional resources.

[49] See for example Curriculum Development Council (2000)

Box 6.4: Four key tasks in the new curriculum framework:

- Moral and civic education – including values and attitudes, national identity, perseverance and respect for others.
- Reading to learn – acknowledging the importance of reading not just for improving language proficiency, but also reading for interest, appreciation and accessing new knowledge and experiences.
- Project learning – to help students develop skills and construct knowledge through a variety of learning experiences.
- Information technology for interactive learning – complementing learning and teaching both inside and outside the classroom.

Successful whole-system implementation in Hong Kong

Under a whole-system approach to implementation, every element of Hong Kong's education system focussed on improving teaching to improve learning.

Whole-system implementation is about deliberately designing and using each element of the system as an implementation tool to reinforce reforms.

It was clear how each element of the system would be used to both 'push' and 'pull' pedagogy in the right direction (see Chapter 5 for a definition of 'push' and 'pull'). Below are ten elements of the Hong Kong system that were used as implementation tools to improve learning and teaching:

a) Curriculum

b) Student assessment

c) Teaching and learning resources

d) School leadership

e) Academic research

f) Teacher professional development and in-school support

g) Teachers' teaching and working time

h) School accountability: whole-school inspections

i) School accountability: focus inspections

j) School autonomy

Each implementation tool is discussed below.

a) Curriculum

A major implementation tool for improving teaching practices was the development of a new curriculum framework for both basic education (primary and junior secondary) and senior secondary education.

> *"The curriculum was the key to changing pedagogy"*
>
> *–Catherine KK Chan, Deputy Secretary, Hong Kong Education Bureau, Hong Kong Special Administrative Region*

Curriculum reform was "a disruptive reform".[50] It allowed for radical change and provided an opportunity to change pedagogy in every school. While the curriculum framework detailed *what* students should learn, it had a strong focus on *how* students learn. In turn teachers became focused on pedagogy and creating learning experiences for students.

The curriculum reform:

- 'Trimmed' previous curriculum to provide teachers more space to develop practices that got their students to 'do more thinking, questioning, communicating and cooperating with others as well as taking part in and experiencing new things.'[51]
- Organised curriculum into key learning areas that shaped the types of learning experiences students require and deserve.[52]
- Detailed the generic skills that students were required to develop across all key learning areas. These skills will help students learn to acquire, construct and apply knowledge to solve new problems. They include collaboration, communication, creativity, critical thinking, information technology skills, numeracy, problem-solving skills, self management skills and study skills.[53]

The curriculum detailed expectations for students' learning and teaching practice at every level and in every key learning area. For example, in mathematics, primary 1– 3 students are expected to understand basic mathematical concepts and computations, apply their skills in daily life and show an interest in learning maths. Teachers are explicitly expected to avoid drilling, to use a range of learning activities (including role play and manipulation of real objects) and to use diversified assessments including classroom observation and questioning.[54]

[50] Grattan Institute interview at Hong Kong Education Bureau (2011)
[51] Curriculum Development Council (2000)
[52] Cheng (2011)
[53] Education Commission (2000)
[54] Curriculum Development Council (2000)

Box 6.5: Example of expected changes in pedagogy through the new curriculum framework - Chinese language for Primary 1–3 students

Students are encouraged to: have more practice in listening and speaking; have less recitation but develop more knowledge and recognition of characters; develop a habit in reading; and read more simple literary works to sense the rhythm of words and appreciate the beauty of images.

Teachers are expected to: provide more opportunities for students to listen and speak; cultivate their interest in recognising and writing characters; lead them to learn rhythm through chanting simple literary work; and let them feel the rhythm of characters and the beauty of image. They are also expected to: listen to students; provide more opportunities and encourage them to express their own ideas freely; never block the development of their thinking skills; and, avoid too much practice and untargeted recitation.

Another example of how the new curriculum was used to change pedagogy was the development of the new senior secondary subject 'Liberal Studies'. In the New Senior Secondary Curriculum, students must now undertake four core subjects (Chinese, English, Mathematics and Liberal Studies) plus two to three electives.[55] Liberal Studies includes the study of current affairs and contemporary issues drawn from three major modules: self and personal development, society and culture and science, technology and the environment. Amongst other things, Liberal Studies aims to help students to understand contemporary issues, develop independent and critical thinking skills, creativity, problem solving and communication skills.

However, there are no prescribed contents for the Liberal Studies curriculum. Teachers have to develop their own teaching and learning tools. They need to interpret the curriculum requirements and consider students' prior knowledge and interests. They must consider interrelationships between concepts and learning areas and develop topics, lesson plans and assignments that help students develop particular skills. They have to develop skills for enquiry-based learning, group discussions, brainstorming, lectures and site visits, journal writing, role plays and surveys. Teachers' autonomy is increased, but so are their responsibilities.

Box 6.6: School-based curriculum development

Hong Kong shifted from having a centrally developed and prescribed syllabus to a holistic curriculum framework delivered through school-based curriculums. Schools were able to adapt the central curriculum to the learning needs of their students, giving them flexibility in time, space and environment to deliver the curriculum for students.

However, there was a long lead-time for implementing school-based curriculum reform. For four to five years capacity was built in schools for the introduction of the new senior secondary curriculum. This period included 18 months of seminars and information sessions for all schools and teachers. All schools and teachers attended a two-day workshop that enabled every school to plan for the system-wide changes.[56]

[55] Hong Kong Examinations and Assessment Authority (2009)

[56] Grattan Institute interview at Hong Kong Education Bureau (2011)

Box 6.7: Curriculum reforms facilitated pedagogy changes in the classroom

The senior secondary curriculum guide[57] details learning and teaching strategies. It also identifies the need to match different strategies with lesson aims, content and a focus on learning.

Different teaching and learning frameworks are described:

- Teaching as direct instruction - learning as product.
- Teaching as enquiry - learning as a process.
- Teaching and learning as co-construction.

Each framework is discussed in relation to how it best facilitates different learning experiences. The guide includes practical examples of what these look like in the classroom. For example, for 'teaching as enquiry, learning as a process', one method to encourage group discussion is 'instead of correcting a wrong answer, tease out a better one by taking the question round the class or explore the 'wrong' answer to find out how the student is thinking'.

b) Student assesment

If curriculum was the major push to reform learning and teaching, reform of student assessments was the major pull. The reform increased the use of formative assessment to improve learning and teaching and provide the space for creative pedagogy.

Formative assessment focused on shifting the reliance on written tests and exams that test *what* students had learned to broader assessment tools and mechanisms that also assess *how* students learn.

Removing high-stakes public exams

Formerly, exams at the conclusion of primary and junior secondary school were used to allocate students to schools. These were cut and a new student allocation system was introduced that is not reliant on exam results. This change reduced the emphasis on students' knowledge acquisition and exam preparation. The reform pulled teaching away from previously used pedagogies.

Low-stakes testing has also been reduced. Territory-wide Student Assessments (TSA) for Chinese, English and Mathematics were introduced for Primary 3, Primary 6 and Secondary 3 (in 2004) to ensure that schools receive feedback to the extent they are not meeting basic standards. These results are not given to individual students but schools can use their school level results to improve the effectiveness of their teaching and learning. Test results are not published in the community but provided to schools for feedback and self assessment to improve their work. While these tests were meant to reduce the examination burden of students, even the low stakes testing for Primary 6 has been suspended for 2012 – 2014 to relieve students' pressure from frequent examinations.[58]

[57] Education Bureau (2009)

[58] Education Bureau (2011a)

Assessment for learning

Hong Kong introduced 'assessment for learning' (or formative assessment) encouraging teachers to use assessment to analyse *how* their students learn and adapt pedagogy commensurately. This is a large shift in Hong Kong which previously used exams to test *what* students have learned. Teachers are now encouraged to use a variety of assessment mechanisms to examine their students' strengths and weaknesses, understand the way their students learn best and to make adjustments to their teaching to improve student learning.[59] This practice has changed the way teachers construct lessons and provide learning experiences for students. For example, the senior secondary curriculum and assessment guide for mathematics encourages teachers to use a variety of assessment tools in the classroom. In addition to tests and homework assignments, teachers are encouraged to use oral questioning in class, projects and exploratory tasks which can all help reduce the need for summative assessment.[60]

School-based assessments were also introduced in senior secondary school to supplement examinations.[61] These assessments are designed to assess a range of students' skills that cannot be captured in traditional exams.[62] Importantly, it has impacted the way teachers teach in senior secondary schools. Teachers are now expected to design different learning experiences for students. Assessment now includes school-based assessment such as coursework, independent project learning and reports and oral presentations to help students develop critical thinking, analysis and communication skills. Multiple observations of student learning also increase the reliability of assessments[63] and now form 20% of final grades for senior secondary students.

Introduction of new standards-referenced reporting

A new assessment rubric was introduced for senior secondary students.[64] Teachers now grade students' work in five levels rather than grades A-F. Each level has a detailed set of descriptors that describe the typical performance of students.[65]

This shift has provided the context for teachers to assess the new skills that students are expected to develop. These rubrics, in conjunction with the new curriculum, are supporting teachers to change their pedagogy.

Assessment in post-secondary education

Changes to university admission criteria have also pulled pedagogical changes in schools. University admission criteria have been broadened from just exam results to include student learning profiles. In addition to students' academic results, it provides qualitative information on students' competencies and specialties. It also includes other learning experiences that students have undertaken, including moral and civic education,

[59] Berry (2008) found a positive effect size on student learning when teachers used formative assessment mechanisms
[60] Education Bureau (2009)
[61] While school-based assessment existed for several subjects previously, this has been introduced across the curriculum over time.
[62] Hill and Wan (2006)
[63] Ibid.
[64] Grattan Institute interview at Hong Kong Examination and Assessment Authority (2011)
[65] Hong Kong Examinations and Assessment Authority (2009)

community service and career-related experiences. Students have the option of writing a self-reflection on their learning and personal development.[66]

Box 6.8: Initial teacher education

Teacher training institutes have also reviewed and amended their initial teacher education curriculum to ensure new teachers develop the new pedagogy. Initial teacher education now links new research on pedagogy to teaching in the classroom.[67]

c) Teaching and learning resources

Resources for teachers focused on practical activities and examples that shifted teachers' pedagogy in the classroom. For example, combined curriculum and assessment guides were developed for the first time in Hong Kong for every Key Learning Area (and subjects in Senior Secondary School). The guides include suggested ways for schools to implement school-based curriculum and assessment measures.

Learning and teaching resource banks were developed to assist schools and teachers implement new teaching practices. For example resource websites were developed on key elements of the strategy including project-based learning, information technology for interactive learning plus different teaching strategies for specific groups of students, including gifted students and students with special needs.[68]

Professional learning further enhanced implementation of improved teaching practices. Learning communities and district-level clusters were developed to enable teachers to learn from others' experiences and re-enforce effective implementation within schools.

d) School leadership

At the school level, Hong Kong put implementation leaders in every school through new school leadership positions. Curriculum leaders posts were created in every primary school, and in secondary schools curriculum leaders were assigned to each key learning area.

Curriculum leaders led teams of teachers and had a direct influence on how reforms were implemented in their school. They were the school champions of effective implementation of new pedagogy.

They were provided with extensive training, including 100 hours of training on curriculum and pedagogy changes (some of which was with their school principal to ensure a consistent understanding of the reforms to be implemented). Follow up training was also conducted three and six months following the initial training.[69]

The Education Bureau undertook multiple steps to assure the *quality* of the training. They selected facilitators carefully and

[66] Education Bureau (2011d)
[67] Grattan Institute interviews at Hong Kong Education Bureau, Hong Kong University and Hong Kong Institute of Education (2011)
[68] Education Bureau (Undated-c)
[69] Grattan Institute interview at Hong Kong Education Bureau (2011)

limited their numbers to ensure the quality and consistency of message. The Education Bureau briefed facilitators on a one-to-one basis to ensure they understood the purpose of the reform and the training. Further, they carefully vetted training materials to ensure quality.[70]

Capacity building of school principals focused on the ability to implement reform. A new leadership program was developed for all principals including aspiring, newly appointed and serving principals.[71]

Aspiring principals now undertake a 'Certification for Principalship' process. Aspiring principals are required to undertake a needs analysis, as well as a 'Preparation for Principalship' course which includes information about, and the skills to implement, Hong Kong's reform agenda. [72] Six key areas of responsibility for principals are covered:

- Strategic direction and policy environment;
- Learning, teaching and curriculum;
- Teachers' professional growth and development;
- Staff and resource management;
- Quality assurance and accountability; and
- External communication.[73]

New principals undertake an induction program run by the Education Bureau who also provides structured support programs for these principals.[74]

Serving principals are offered structured support programs that identify, plan, and facilitate professional development enabling them to implement reforms.[75]

e) Academic research

Funding for higher education research was targeted to collaborative research and development projects ('seed projects') for pedagogical reform in schools.

These research projects have helped teachers and schools develop effective practices in their local school context.[76] This program also includes secondments of teachers working on their school projects to the Education Bureau in order to carry out the research/project, creating stronger feedback loops between the bureau, schools and teachers.

[70] Grattan Institute interview at Hong Kong Education Bureau (2011)
[71] Education bureau (undated-b)
[72] Grattan Institute interview with school principals and teachers, Hong Kong (2011)
[73] Education Bureau (undated-d)
[74] Education bureau (undated-b)
[75] Ibid.
[76] Education Bureau (undated-a)

Box 6.9: Learning 2.0 Case Study - helping to implement pedagogy reform in Liberal Studies[77]

Funding was allocated through the Quality Education Fund (QEF) that was established in 1998 to help finance projects for the promotion of quality education in Hong Kong.[78] As reforms were introduced, funding for QEF projects were aligned with reform priorities.

The QEF funded The University of Hong Kong researchers to develop an online, interactive learning and assessment platform called Learning 2.0. Over four years, researchers collaborated with ten secondary schools to develop the platform for the new senior secondary subject Liberal Studies. The platform helps teachers implement pedagogy, curriculum and assessment reform.

Learning 2.0 provides a repository of pedagogy and assessment mechanisms. Pedagogy tools include scaffolding tools and thinking tools to support enquiry-based learning. The platform supports assessment tools for formative assessment; including assessment rubrics, audio and text based feedback to students. The platform also facilitates online teacher networks, providing an open environment for teachers to discuss, develop and share curriculum and pedagogy practices that improve student learning in Liberal Studies.

The online platform helped shift student learning from a passive process to a more interactive medium, allowing students to explore knowledge and build critical thinking capacities. Students can create mind maps, and start blogs to explore their ideas on current issues. Additionally students can interact with their peers through forums and chat rooms to discuss issues of interest and collaborate for group projects. These features promote student self and peer-to-peer evaluation in student learning.

The Education Bureau is looking to disseminate the Learning 2.0 across the Hong Kong education system.

f) Teacher professional development and in-school support

Behavioural and cultural change requires continuous support within schools and classrooms. One-off training sessions will not work. Resources are required (including expertise) for coaching, new materials and perhaps most importantly, freeing up teachers time for preparation and learning.[79] Collective processes (or professional networks) are important for teachers to continue to develop their practice.[80] Hong Kong has used all of these implementation tools to reform teaching.

A Continuing Professional Development (CPD) framework was introduced in 2003.[81] It was aligned to the sequencing of reforms so that extensive capacity building takes place before each reform is introduced into schools. Capacity building was aimed at teachers, school heads, Primary School Curriculum Leaders and Key Learning Area Curriculum Leaders aligned with

[77] Grattan Institute interview at The University of Hong Kong (2011)
[78] http://qef.org.hk/eng/index.htm
[79] Levin (2008)
[80] Fullan (2010)
[81] The Advisory Committee on Teacher Education and Qualifications (2003)

implementation timelines. Schools now recognise the importance of professional development for implementing reforms.[82]

Teachers are required to undertake a minimum of 150 hours of professional development in a three-year cycle, including both structured learning (seminars, workshops, conferences) as well as other activities including collaborative practices, mentoring and professional reading.[83]

The Education Bureau's professional development activities are published four months prior to a new school year commencing. Schools and teachers can then plan their professional development activities in advance, enabling them to fulfil professional development requirements in accordance with the CPD Framework.

In 2011/12 the Curriculum Development Institute is offering professional development to improve teaching practices of senior secondary teachers that align with implementing the new senior secondary curriculum and school-based assessment mechanisms.

In-school support programs also played an important role in implementing pedagogical reform. These programs are run by the bureau and are designed to provide professional development and advice to teachers and schools to implement both the new curriculum and teaching practices. School-based support is provided by Education Bureau staff (including teachers and academics) who negotiate a support model to suit individual schools. Support can be provided for curriculum development for key learning areas and language learning.[84] On-site support can include regular collaborative lesson planning with teachers, collaborative research and development projects, professional development including seminars, workshops, study groups and sharing sessions, and consultancy services for curriculum and pedagogical issues. School development officers also facilitate professional learning communities allowing professional sharing and discussion of issues identified by teachers.[85]

g) Teachers' teaching and working time

Teachers' teaching and working time was altered to improve professional collaboration, learning and capacity building.[86] Time was allocated in teachers' working day to help implement changes to teaching practices. This time increased mentoring and professional collaboration that has continually been shown to have a substantial impact on learning and teaching.[87]

Collaborative lesson preparation time was introduced for schools and teachers who sought in-school support to implement reform.

[82] Grattan Institute interview with school principals and teachers, Hong Kong (2011)
[83] Advisory Committee on Teacher Education and Qualifications (2003)

[84] Support is also provided for other areas such as Mainland-Hong Kong Teachers Exchange & Collaboration programme, university-School Support Programmes for Primary and Secondary Schools and the Professional Development Schools (PDS) Scheme
[85] Grattan Institute interview at the Education Bureau, Hong Kong (2011), Education Bureau (2007a), Education Bureau (2011b)
[86] Mourshed*, et al.* (2010) also identifies technical skill building as one of the 6 common interventions across systems. The others are data systems, revised standards and curriculum, teacher and principal compensation and policy documents that articulate the aspirations, objectives and priorities of reform
[87] OECD (2009b) discusses the literature.

It allowed teachers to discuss new learning and teaching strategies with support from external experts.[88]

A culture of classroom observation was also developed, providing teachers with the opportunity to observe, reflect on, and model pedagogy changes.

These collaborative practices also provided a form of horizontal accountability to implement curriculum, assessment and pedagogy changes.

h) School accountability: whole school inspections

Accountability mechanisms provided the 'pull' on learning and teaching to balance the 'push' of many implementation tools.

Increased autonomy for teachers and schools has acted as a push for reform of teaching practices but a strong evaluative culture has provided the pull. Too much push or pull that is not compensated by the other can be damaging. Reform in Hong Kong highlights the need for effective balance.

Hong Kong introduced a school development and accountability framework in 2003-04 to ensure that schools were effectively implementing changes to teaching practices. The framework includes whole-school inspections (external school reviews), school self-evaluations and focus inspections within schools.

Whole-school inspections provide a school accountability mechanism to monitor, evaluate and enforce the implementation of improved teaching practices. The inspections focus on the four domains of:

- Learning and teaching;
- Management and organisation;
- Student performance; and
- Student support and school ethos.

Lesson observations, staff questionnaires, evaluation of students' work, and discussions with parents and members of the school community were used to analyse implementation of teaching reforms. The reports from these inspections are never made public, but schools are required to release the findings for information, feedback and accountability to key stakeholders including the school management committee, teachers and parents.[89]

i) School accountability: focus inspections

Focus inspections are designed as formative assessments and are developmental in nature. They help teachers, curriculum leaders, school principals and other school leaders develop specific aspects of the new teaching practices.

Teams of staff from the Education Bureau (including teachers and academics) spend between one and three days in a school observing lessons, interviewing and discussing teaching and

[88] Curriculum Development Council (2000)

[89] Education Bureau (2011c)

management practices with staff. At the end of the inspection, staff are given feedback and provided with assistance to improve their practice. A written report is given to the school within eight weeks.

Focus inspections concentrate on a particular area of reform (as opposed to a whole-school inspection) such as assessment for learning, classroom observation techniques and various aspects of 'learning to learn'.[90]

j) School autonomy

Increased autonomy for both school principals and teachers was important for implementing reform of teaching practices. It enabled effective change in schools. For sustained behavioural and cultural change, people benefit from some control and ownership of reform.

Autonomy was provided in a number of areas ranging from curriculum, pedagogy, school structure and timetabling. Greater flexibility was granted to schools to operate in a way that improved learning for their students.

Schools could alter class sizes according to different learners' needs, or alter the structure of their school timetable to provide the best learning opportunities. For example, schools could schedule uninterrupted learning time (e.g. 2-3 periods a day to an activity) or dedicated time for project learning (an important element of the new pedagogy).[91] This change in learning time also encouraged teachers to think differently about the learning opportunities they provide. Teaching in two-three hour blocks for the benefit of student learning forces teachers to deliver very different learning experiences compared to delivering a 40-minute classroom 'routine'.

Hong Kong's implementation of these changes again recognised that school principals, school leaders and teachers are the frontline of effective implementation.

6.1 Other characteristics of Hong Kong's reform that supported whole-system implementation

There were several other characteristics of Hong Kong's reform that supported effective whole-system implementation. These were:

1. Overall coordination and feedback loops within the education system
2. Engagement and consultation
3. Sequencing of implementation
4. Incremental implementation of large elements of reform

[90] Curriculum Development Council (2000) Hong Kong defined 'learning to learn' as a process developing students independent learning capabilities, leading to whole-person develop and life-long learning. The means to do this included the development of general skills, the use of different methods of learning and teaching, the development of students' own interests and potential and the widening of students' learning space.

[91] Ibid.

6.1.1 Hong Kong ensured overall coordination and feedback loops within the education system

Hong Kong's strategy and implementation was supported by inbuilt coordination and feedback loops between the Education Commission, Ministry, government, schools, universities and business community.[92] The Education Commission established working groups during strategy and implementation planning with representatives from each stakeholder group. The Education Bureau worked closely with the Curriculum Development Council and the Hong Kong Examinations and Assessment Authority (HKEAA) to implement and coordinate assessment reforms. Weekly implementation meetings are still held between HKEAA and the Education Bureau ten years on.

Links between the Education Bureau, initial teacher education institutes, academics, researchers and schools have also been strengthened to provide system-wide coordination in implementing the reforms. The Education Bureau has actively worked with academics in both the policy design and implementation planning stages. Academics have both promoted reforms throughout the system in addition to reviewing teacher-training curriculum.

The Education Inspectorate provided both quantitative and qualitative data to the Education Bureau that enabled detailed analysis of how implementation was progressing. The data provided in-depth analysis of implementation of parts of reform. For example, focused inspection data provided significant detail about how reading pedagogy reforms were being implemented in schools and classrooms.

The Education Bureau has also fostered strong partnerships between schools and universities to build teacher capacity and conduct research. Through the Education Bureau's Quality Education Fund (QEF) academics and researchers have been able to work directly with schools. Research funded through the QEF develops new and innovative ways to implement education reforms within specific school contexts. Schools now have direct access to leading researchers to both develop and spread best practice pedagogy.

Throughout the reform process, feedback loops have been fostered throughout the system and particularly in schools. Principals, subject heads and teachers all undertake classroom observations and receive feedback on how to improve their teaching practices. Other feedback loops between teachers have also been developed with networks established to allow teachers to share implementation lessons and best practice.

6.1.2 Engagement and consultation was critical to both strategy design and implementation planning

Teachers are the frontline of reform. Implementation can only be successful when teachers' motivation is high.[93] Any reform needs to engage with teachers at both the school and system level, listen to and acknowledge their expertise and gain their

[92] Education Commission (2000)

[93] Levin (2008) – Levin talks about improvements being a matter of 'will' (motivation) and skill (capacity).

commitment to implement reform. Reforms must therefore appeal to both the idealism and professional commitment of educators.[94]

Hong Kong's strategy development was subject of lengthy and in-depth community consultation. During this period, the Education Commission conducted three stages of community consultation. The first stage focused on developing the aims of education in Hong Kong. The second and third phases focused on the framework for education reform and then the reform proposals themselves.

Feedback was obtained not just about the specific reforms, but also their implementation and the operations of the Education Bureau, quality assurance mechanisms and school based management.

Consultation strengthened implementation planning: different stakeholders identified different potential problems with the implementation process that were addressed before reforms had even begun to be implemented.[95] Schools and teachers were also given the opportunity to comment on the conditions and support they needed to implement reforms in the classroom.

Box 6.10: Community consultation on education reform in Hong Kong

Stage 1: Consultation on aims of education.[96] The Education Commission received over 14,000 submissions of public comments. In light of these submissions, and work undertaken by the Education Commission, a proposed framework was developed for consultation in Stage 2.

Stage 2: Consultation on the proposed framework for reform including the academic structure, curricula and assessment mechanisms. The consultation process included 34 forums and seminars, with attendance exceeding 10,000.[97]

Stage 3: Review of education system reform. Consultation was conducted on both the strategy and implementation strategy. The communication strategy during this stage was well articulated. The strategy included abridged versions of the consultation documents, timetables of seminars regarding different reform elements across Hong Kong (17 x 3 hour sessions across districts), and TV announcements.

Ongoing consultation with schools and teachers was also conducted. Importantly, the Education Bureau listened and responded to feedback. One recent example was their decision to slow down the introduction of school based assessment reforms. Unions and teachers identified that longer time was needed to

[94] Levin and Fullan (2008). Fullan (2008) also states the first 'secret' is to 'love your employees' by investing in them, enabling them to learn continuously and to find meaning in their work.

[95] Barber (2008) and Barber, *et al.* (2011) highlighted the need for governments to listen and respond to feedback about the implementation process. Governments that continuously learn throughout the implementation process and make adjustments where required will implement reform more successfully. This requires 'frequent, honest, two-way communication about successes and challenges; about what is being attempted and its challenges and setbacks as well as accomplishments.'

[96] All consultation documents and summary of public views gathered (including transcripts of sessions) and how they were incorporated into the following consultation phases are still available on the EDB's website at: http://www.e-c.edu.hk/eng/online/index_e.html

[97] http://www.e-c.edu.hk/eng/online/on4_2nd1.html retrieved 24 November 2011

allow teachers to adjust to the assessment changes.[98] Another example was the quick decision to provide additional financial support to schools in implementing Liberal Studies in the New Senior Secondary curriculum in September 2010. Changes in implementation have been achieved without detracting from the quality of the reforms.

Throughout the reform process, all government education authorities actively engaged with parents. Parents are important stakeholders whose support can greatly increase the effectiveness of implementation programs. Conversely, they can halt the implementation of reforms in schools if they actively oppose the changes.

Large-scale consultation to explain, share information and obtain feedback on the reforms was crucial. The Education Bureau held parent forums for every major reform, often attended by between 500 – 600 parents.

In addition, for each stage of the reform - for each change to teaching practices - resources were created for parents to better understand the reforms in order to support schools and also become involved in the changes to their children's learning.

6.1.3 Hong Kong sequenced the implementation of parts of the reform.

Hong Kong sequenced when parts of reform were implemented based on:

- The urgency and seriousness of the problem;
- The impact the reform had on the quality of education;
- Whether essential pre-conditions were already in place; and
- Whether the sequence of implementation was logical.

As a result, Hong Kong implemented the elements of reform that were most urgent and were the pre-cursors for other major parts of the strategy. The initial priorities were: reform of how students were allocated places in primary schools, secondary schools and university admissions; improving existing public examinations; improvements in early childhood education; and, capacity building in schools.

6.1.4 Hong Kong incrementally implemented large elements of reform

More 'radical' phases of the strategy were piloted and implemented incrementally in order to allow stakeholders to adjust to the changes, but also identify and rectify problems during a transitional period. Trials were conducted in schools that were deemed 'more ready' to implement the new senior secondary curriculum. The lessons from pilot schools were then used as implementation examples for other schools.[99]

6.2 Effective resource allocation in Hong Kong

Resources were allocated to implementing reform in Hong Kong. Adequately funding implementation was just as important as

[98] Grattan Institute interview at Education Bureau, Hong Kong (2011)

[99] Education Commission (2000)

allocating resources between different programs.[100] Resource priority was accorded to basic education changes, one of the first elements of the strategy to be implemented. The education strategy identified the reform elements to be launched in the first three years and the supporting measures that would require additional funding. Supporting measures often focused on capacity building.[101] The government also earmarked additional recurrent funding to be allocated to primary and secondary schools to employ extra staff or services that would help reduce teachers' workloads, giving them additional time to implement reforms.[102]

Continual reallocation of resources, based on feedback and evaluation of reform implementation, was crucial to effective implementation and keeping reform within budget. Evaluations of implementation were planned up-front so all stakeholders knew that it would follow every major implementation step.[103]

Evaluations were conducted by the Education Commission. Most importantly, they were not hollow reviews; the government listened the to the outcomes and stakeholder feedback and adjusted their implementation plans continually to improve the implementation process. The reviews were undertaken after each major implementation stage of reform and a further review will take place in 2012, marking ten years of implementation. In addition, the Education Bureau surveyed school principals and teachers regarding the implementation of the major curriculum reforms and this feedback was incorporated into future implementation planning.[104]

6.3 An example of effective reform in Hong Kong: the dramatic improvement in primary school reading performance

In the 2001 Program of International Reading Literacy (PIRLS), Hong Kong ranked 17 out of 35 countries. In just five years, Hong Kong moved from 17th in 2001 to 2nd in 2006, only one point behind the mean of 1st placed Russia. Importantly, Hong Kong also saw large increases in mean scores for understanding information and literary texts.

Hong Kong's reforms have driven this rapid improvement in students' reading. Pedagogy changes have been implemented through a combination of curriculum and assessment reforms. All of which have been based on new research of how students learn most effectively. As a result, student motivation and literacy improved very quickly.

A large focus of Hong Kong's education reform was to improve reading literacy. 'Reading to learn' is one of the new curriculum's four 'key tasks'. Hong Kong wanted students to develop a reading culture and read 'for learning and pleasure'.[105] An increase in

[100] Levin and Fullan (2008)
[101] Ibid.
[102] Education Commission (2000)
[103] Grattan Institute interview at Education Bureau, Hong Kong (2011)
[104] Education and Manpower Bureau – Report of survey on the reform of the school curriculum and the implementation of Key learning area curricula in schools (2003, 2004 and 2005). These surveys had high participation: in 2004, a total of 4553 primary school and 2594 secondary school teachers responded equating to response rates of 94.8% and 87.2% respectively.
[105] Education Commission (2000)

learning ability would increase independent learning skills, appreciation of different material and access new knowledge.

Learning to read and write Chinese characters is extraordinarily difficult. Many Chinese characters are pictographs that on average contain 12.7 pen strokes. Unlike the English alphabet, every character represents a word. Further, complex characters are made up of different elements, or different characters themselves. As a result, people have to memorise large quantities of characters – a person needs to know approximately 2500 characters in order to read an average newspaper.

Before the 2000 reforms, students learned Chinese characters by repeatedly copying them until they could reproduce their form and pronunciation from memory. Traditionally, students learn in a bottom up sequence, learning how to write characters, then sentences, followed by paragraphs and then passages.[106] However characters were taught on the basis of how often they appeared in adult communication, outside the context of children's' communication and their development.

Changes in pedagogy that would help students learn more effectively were facilitated by curriculum reforms that focused on Chinese as a key learning area. Teachers were explicitly encouraged to change their pedagogy to provide learning experiences including more opportunities for students to listen, speak and build up their vocabulary, to encourage students to express their ideas freely and to avoid too much practice and untargeted chanting and recitation.[107] Learning increased through more practice in listening and speaking, develop more knowledge and recognition of characters and develop a habit and love of reading.

Researchers from The University of Hong Kong developed a new 'integrative perceptual approach' to learning and teaching Chinese. The method was developed based on an extensive review of learning theories. The new pedagogy moves away from memorisation of single, isolated characters towards integrating the way students perceive the meaning and structure of Chinese with the process of reading, writing and using language.[108]

In order to implement the new pedagogy, researchers engaged schools and teachers. Approximately 1,600 principals, teachers and school librarians attended professional development workshops in which the new concepts and reading theories were explained. Both reading process theory and theoretical strategies for comprehending text were set out.

Over 5000 parents also attended workshops run by researchers teaching them how to support their children in 'reading to learn'. Researchers discussed how to establish a good reading environment at home, how to help develop children's reading ability and how to support good reading habits. The research team also developed a guidebook for parents with children up to nine years of age, to explain the role that parents can play in helping children learn to read and develop their interest in reading.[109]

[106] Tse (2007)
[107] Curriculum Development Council (2000)
[108] Tse (2007)
[109] Cheung, *et al.* (2009)

Box 6.11: An 'integrative perceptual approach' to learning and teaching Chinese

The starting point for students learning characters is their spoken language. Speaking provides meaningful context for the characters. Using the integrative perceptual approach, teachers put characters into context (e.g. nursery rhymes and games) that provide meaning, allowing students to associate character structure and written form with sounds. Students then learn the parts (individual characters and their structure and component parts) and learn characters in clusters that have similar structures.

Changes in teaching practices are also pulled by changes to assessment tools. Instead of undertaking traditional Chinese dictation of having to write down exact passages and characters as they are spoken, teachers and students now use 'creative dictation'. A teacher presents students with a theme (such as 'spring' or 'breakfast') and students can write down as many words and ideas related to the theme. This exercise provides students with a familiar context for learning characters. Students are motivated to learn as many characters as possible – teachers award marks for every correct character or word; there is no maximum mark and no marks are taken off for characters written incorrectly. Teachers can use this tool to identify slow and fast learners and develop their learning and teaching strategies according to student needs.[110]

[110] Cheng (2011)

Following a whole-system implementation approach, a number of additional tools were used to implement reform of teaching reading:

- Learning and teaching resources were developed providing sample lesson plans and exemplars using the new pedagogy. Textbooks were upgraded with the new pedagogy in order to reduce rote learning.[111]
- Curriculum leaders in schools developed reading goals for their students. They also provided support for teachers to implement the new reading pedagogy in their classrooms, aligned with the new curriculum framework.
- Research academics provided in-school support for teachers to introduce and implement the new approach.
- Teachers were provided with professional development workshops and seminars.[112] Classroom observations provided feedback to teachers on implementing the new pedagogy.
- Teachers were able to share their experiences with colleagues in local networks to learn how others had implemented the new methods.
- Teachers worked closely with parents to implement reform.[113]
- Whole school inspections provided feedback to schools and teachers through classroom observations of primary school reading classes using the new pedagogy.[114]

[111] Tse (2011)
[112] Ibid.
[113] Ibid.

- Schools used Education Bureau focus inspections to gain support and feedback from academics and other teachers in how to improve their classes using the new pedagogy.
- Changes were made to initial teacher education. At the University of Hong Kong, the curriculum now includes the outcomes and implications of PIRLS (2001 and 2006) in teacher training programs as well as studies of bilingual reading.[115]

These implementation tools were complemented by additional tools including:

- Training reading ambassadors and parents to read stories in schools;
- Implementing the Reading Contract Project where students commit to reading at least 10 books over summer holidays; and
- Encouraging parents to promote after-school reading activities and encouraging students to choose their own reading material and read for pleasure.

The impact of this new approach on student reading has been significant. Academic research tested the impact of this approach with grade one and two students in four primary schools over a one year period. An experimental group was taught for 25% of class time with the new approach and the remaining time using the traditional approach. The group significantly outperformed students taught using only traditional methods.[116]

[114] Ibid.
[115] Tse and Loh (2007)
[116] Tse (2007)

Table 4: A summary of Hong Kong's implementation tools to improve learning

Curriculum

Curriculum reform – to suit the new teaching and pedagogy. The new curriculum should 'push' teachers to adopt new pedagogical approaches focusing on '*how*' to teach as well as '*what*' to teach.

School based curriculum development – requiring schools and teachers to develop new curriculum and pedagogy within the new curriculum framework.

Student assessment

Assessment for learning – develop rubrics and formative assessments that assess the newly defined learning skills. This requires teachers to develop the new teaching and pedagogy specified in the strategic objective.

Remove high stakes public examinations – used for student allocation to schools. Instead, low-stakes testing helped teachers develop new pedagogy.

Amend post-secondary assessment and university entrance requirements – so students have to possess the new learning skills to advance to post-secondary education.

Professional learning

Professional development framework – to detail pedagogical skills that assist teachers in planning professional development throughout their career. Professional development must also be aligned to implementation to support teachers implementing changed pedagogy in the classroom.

In-school support programs –classroom and school-based professional development and advice for teachers to implement new pedagogy, including classroom observation and feedback, collaborative lesson planning, school-based research.

Teaching and learning materials & resources – to develop resources for each learning area that develop the new teaching and pedagogy to be used with the new curriculum such as combined curriculum and assessment guides.

Reform to teachers' teaching and working time

Time allocated in teachers' working day to implement changes in teaching practice. Collaborative lesson planning and classroom observation introduced to support teachers implementing reform.

Accountability

School evaluations – to assess the effectiveness of schools in implementing new teaching and pedagogy and implementation tools.

Focus evaluations – to provide expertise and support for schools to develop new teaching and pedagogy to increase learning.

School leadership

Curriculum (and/or pedagogy) leaders – to lead and develop all teachers in each school to implement new curriculum/pedagogy.

School principal training – to create role models with high-level skills in the new pedagogy and lead behavioural and cultural change in schools.

Academic research

Funding for higher education research working directly with schools and teachers to develop effective pedagogy and implementation practices in their local school context.

School autonomy

Increased flexibility for schools to implement pedagogical reform including school-based curriculum development, school structure, class size and timetabling.

7. Initial teacher education

Highlights

- Teachers are recruited and paid as civil servants during their initial teacher education in Singapore, significantly raising costs. However, this approach creates a high retention rate and attracts the best and the brightest to the profession, effectively raising the status of teachers. Initial cost outlays must be weighed against significant longer term savings.
- In Singapore, a strong tri-partite relationship exists between the National Institute of Education, the Ministry of Education, and schools. Continual feedback, secondments, and joint meetings and partnerships ensure all are focused on the main task of improving school students' learning.
- The evaluation and development of teacher education courses in Korea provide financial bonuses to A-rated institutions. Courses with a D-rating must reduce their student numbers by 50% the following year. The policy has resulted in increased investments to improve the quality of initial teacher education.

Singapore has world-renowned initial teacher education that produces highly effective teachers with strong pedagogical skills and content knowledge equivalent to a specialist degree. Quality is continuously increased through an unrelenting focus on school students' learning.

Korea has engaged in substantial reform of initial teacher education that provides an important example of implementation of sectoral reform.

This chapter focuses on initial teacher education in Singapore and Korea. It begins with a discussion of the objectives and context of initial teacher education in Singapore. It then discusses the structure and content of the course offered by the National Institute of Education (NIE) in Section 7.2.1. Section 7.3 examines the policies and programs supporting effective initial teacher education.

Implementation issues are discussed in Section 7.4. Section 7.5 discusses innovative implementation to develop and evaluate initial teacher education in Korea.

7.1 Objective and context

The most direct and effective way of raising teacher quality is to improve teacher education and recruitment in tandem with improving teachers' professional learning. The first step is assessing and then choosing only those best suited to become effective classroom teachers. They are attracted to excellent initial teacher education that produces high quality professionals.

Successful initial teacher education produces teachers with strong subject content knowledge, pedagogical expertise, and classroom management techniques for the 21st century.

Box 7.1: A disconnect between policy and the classroom - initial teacher education

Many OECD countries report serious concerns about initial teacher education:[117]

- Attracting few high achievers, few males, and few candidates from minority backgrounds.
- The perception of education as low quality.
- Poor connections to induction programs and in-service professional development.
- High rates of attrition.

Strong initial teacher education provides not only the theoretical basis and pedagogical tools for teaching but experience in schools through practicums. These real-world experiences are ideally supported by reflection and assessment during and after initial teacher education. Importantly, the best programs prepare student teachers to continue to seek development opportunities throughout their career as part of ongoing professional learning.

7.2 Initial teacher education in Singapore

The initial teacher education program in Singapore focuses on learning and development theory as well as providing pedagogical tools and strong subject content knowledge. The expected outcome is proficiency on a set of competencies for 21st century teaching (values, skills, and knowledge requirements).[118]

7.2.1 How does it work?

Highlights

- Initial education provides teachers with high subject content knowledge that is the equivalent of specialist degrees. For example, mathematics teacher graduates receive the equivalent mathematics education as a student in a straight mathematics degree at other universities.
- The course is continually developing to improve the impact on school students' learning. In order to concentrate resources and have the necessary time for the development of core skills and practical knowledge, NIE has removed many electives such as the philosophy and history of education, and curriculum and assessment design.
- The course emphasises service to the profession, including significant community service and personal development that requires reflection on the choice of teaching as a career. These components of the course are important for retention and job commitment.

The NIE is the sole provider of initial teacher education in Singapore.[119] Their initial teacher education program emphasises

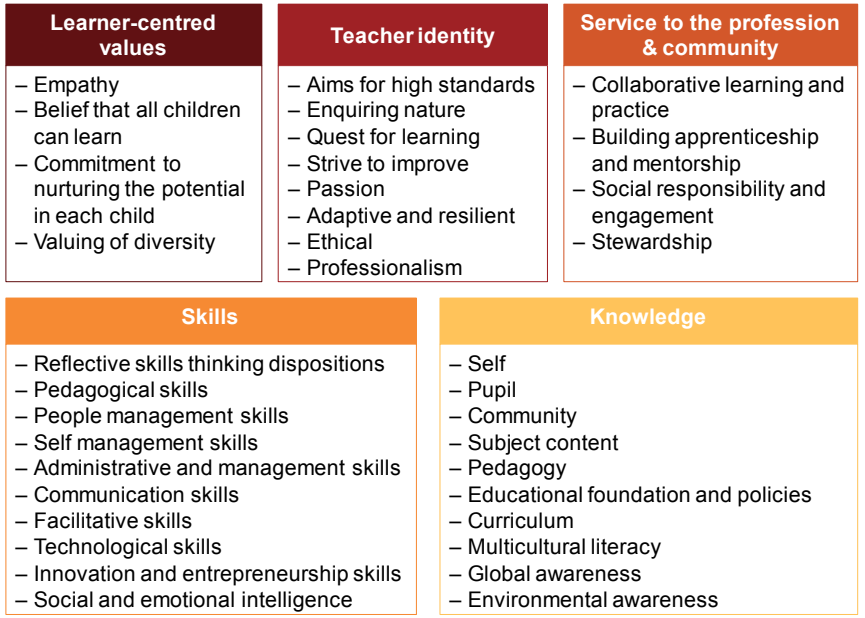
[117] OECD (2005)

[118] National Institute of Education (2009)

the practical skills required for effective teaching. It is centred on a set of three values: learner-centred values, teacher identity, and service to the profession and community. Specified knowledge and skills are then overlaid on these values. As with many countries the focus is on 21st century skills and knowledge transfer (see Figure 9).

The largest proportion of students in the program is enrolled in a four-year degree (BA/BSc (Ed)). There are several other routes to certification including a one-year post-graduate degree and a two-year Diploma (Primary education only) for students who do not have a university degree.[120]

Figure 9: Attributes of the 21st century teaching professional



Source:(National Institute of Education, 2009)

A focus on student learning

The strength of NIE's program is its continuous emphasis on student learning. In order to concentrate resources and have the necessary time for the development of core skills and practical knowledge, NIE has removed many electives often found in initial teacher education in other countries. These include the philosophy and history of education, and curriculum and assessment design. New teachers are required to have expertise in the practical classroom skills required for effective learning and

[119] NIE is an autonomous research and teaching institute within Nanyang Technological University.
[120] National Institute of Education (2009)

teaching before they enter the profession. Philosophy and history of education and elements of curricula and assessment are only included in Master's level courses. This change was based on feedback from schools, teachers and the Ministry of Education.[121]

As part of the focus on practical skills, the practicum is an essential component to the teacher education program. Students have 22 weeks of practicum over the four years of their degree, which equates to 17.5 percent of their program. The timing and breakdown over the years of study is:[122]

- 1st year: Two weeks observing (one each in primary and secondary, regardless of the track of the student).
- 2nd year: Five weeks observing and co-teaching.
- 3rd year: Five weeks co-teaching, some teaching.
- 4th year: Ten weeks teaching with aid of mentor.

In the one year post-graduate program, 40% of the time is spent on the practicum. Mentoring programs are in place during and after the practicum. A teacher candidate's grade from the practicum is decided by NIE in conjunction with the school principal and mentors.

High-level content knowledge

All primary teachers must be specialised in at least one academic area, and all secondary teachers must be specialised in two.[123] For example, primary teachers could have a mathematics specialty and secondary teachers could have a mathematics and physics specialty. Thanks to the program's popularity, the Ministry is able to recruit student teachers capable of covering most areas, although some specialised skills (such as music) are always in high demand.

The emphasis on content knowledge is not superficial: a mathematics teacher receives a Bachelor of Science or Mathematics (Ed) that is equivalent to the Bachelor of Science or Mathematics at National University of Singapore. These degrees are held in such high regard that numerous graduates then go on to post-graduate degrees (e.g. in mathematics) at leading international universities.

[121] Grattan Institute interviews at National Institute of Education and Ministry of Education, Singapore (2011)
[122] Ibid.
[123] Grattan Institute interviews at National Institute of Education and Ministry of Education, Singapore (2011)

Box 7.2: Strong subject content knowledge in initial teacher education - an example from Korea

In many Korean education faculties, the emphasis on subject content (and subject-specific pedagogy) means that there are three types of professors that focus on separate areas of teaching: general pedagogy, content specialists, and subject-specific pedagogy.[124]

For example, at EWHA University in Seoul (one of only eight institutions to receive an A rating in the most recent round of evaluations in Korea) the education faculty contains Professors of Economics, Professors of History and other disciplines. These professors teach students who will be teaching these subjects in schools. Specialisation and a large focus on subject content is an important component of the evaluation of teacher education institutions.[125]

Personal attributes

Another unique component to the NIE program is its emphasis on service to the profession and community (one of its three central values). This component is labelled “character development” in the program design and has two individual components:

- Group endeavours in service learning, in which groups of 25 teacher education students are required to choose a community target (e.g. working with a local children’s home for children at risk, or in special schools helping with disabled students). Each group performs a needs analysis with their chosen organisation or community. Service and learning objectives are determined and each group is required to have a deliverable at the end. Individual students are also required to complete a self-reflection exercise. The program has been running since 2004.[126]

- Meranti Project: is a two-day professional and personal development workshop for groups of 20 student teachers. Student teachers are pushed to reflect on their choice of teaching as a profession, how best to use and evaluate the latest Ministry initiatives and strategies for coping with being a teacher. An explicit goal of the program is to develop the social and emotional awareness necessary for quality teaching. [127]

7.3 Key programs complementing initial teacher education in Singapore

A number of programs support and complement the quality courses offered by NIE. Four are highlighted here:

- Effective screening and job matching.
- Employment of student teachers.
- Tripartite relationship between NIE, Schools and the Ministry of Education.

[124] Grattan Institute interviews at National Institute of Education and Ministry of Education, Singapore (2011)
[125] Ibid
[126] National Institute of Education (2009), Grattan Institute interviews at National Institute of Education and Ministry of Education, Singapore (2011)
[127] Ibid., Grattan Institute interviews at National Institute of Education and Ministry of Education, Singapore (2011)

- Incentives for NIE to continually improve school education.

Screening applicants and job matching

In Singapore, initial teacher education is aimed at attracting candidates from the top 30% of high school graduates.[128] Places in the initial teacher education program offered by NIE are highly sought after: only 2,300 students a year are accepted out of 18,000 applicants.[129] Demand is heightened through specific programs.

Internship and attachment programs are offered to prospective student teachers to raise interest in the profession and allow applicants to see if the classroom is a good fit for them. Importantly, it also allows schools and NIE to see if potential initial teacher education students have the required attributes to eventually become an effective teacher. These programs are of two different types:

- Teaching Internships are offered to highly sought after prospective student teachers (i.e. those with excellent grades). Potential applicants receive a scholarship to teach in a real classroom for a short period of time (one week to three months). The program raises interest in teaching and serves to assess the suitability of candidates for a teaching career.[130]
- Teacher Attachment Program allows students with an interest in teaching to likewise teach in a classroom for a short period of time, but without a scholarship.[131]

For both of these programs the performance and suitability of the teacher candidate is assessed and this information is fed into the interview process for acceptance into the initial teacher education program.

Selection for interviews is tough. Only approximately 4,500 of the original 18,000 applicants make it to this stage and are selected for an interview.[132] The interviews are conducted by a panel chaired by a school principal or senior teacher and include members from the Ministry of Education and advice from the NIE. Candidates are assessed on three criteria: academic qualifications, teaching ability, and disposition to be a teacher (i.e. purity of intent, dedication to the profession).

Passing the interviews is difficult. Only approximately 2,300 applicants are accepted into the program per year. The number of teacher candidates that enter the program each year are specified by the Ministry with input from the NIE.

Once teaching students enter NIE, they undertake practicums that not only serve to develop their teaching skills, but improve job matching. Teachers are allocated to practicums in schools that are suited to their skills and personal traits. The allocations are made to schools that have vacancies coming up and are considered to be a good fit with the student-teacher. The

[128] Grattan Institute interviews at National Institute of Education and Ministry of Education, Singapore (2011)
[129] Ibid.
[130] Ibid.
[131] Ibid.
[132] Ibid.

practicum therefore offers an opportunity for both the schools and the student teacher to see if they are a good match.

Student teachers are paid employees

Once accepted into the program, teacher candidates are civil servants whose tuition and salary (for the first two years) is paid by the Ministry of Education. Teacher candidates sign a bond that requires them to stay in the teaching profession for four years after completion of the BA/BSc program (three years if a Diploma or post-graduate program).[133] Financial support for student teachers is a deliberate strategy with three explicit aims:

- Attracting the best and brightest who might otherwise be wooed by other careers with more immediate financial compensation (e.g. in business);
- Sending a clear message that the Ministry values and highly esteems its teachers; and
- Ensuring student teacher retention throughout the program and during the initial years of teaching. The retention rate for initial teacher education is around 97% for all programs and for the first three - four years of teaching. At the ten-year career mark, 60-65% of the original cohort is still in the profession.

A tripartite relationship: NIE, schools and the Ministry

An important feature of this system is the tripartite relationship between the Ministry of Education, the NIE, and schools. This relationship emphasises the link between theory and practice that is crucial for effective teacher education (see Figure 10).

Labelled the "Enhanced Partnership Model", this relationship serves to strengthen the link between theory and practice by providing constant feedback between the NIE, which provides the theoretical foundation, the schools, which provide the practical experience, and the ministry, which sets the strategy and direction for the teaching profession.[134]

Box 7.3: Responsibility for effective teachers - quality is the bottom (and only) line

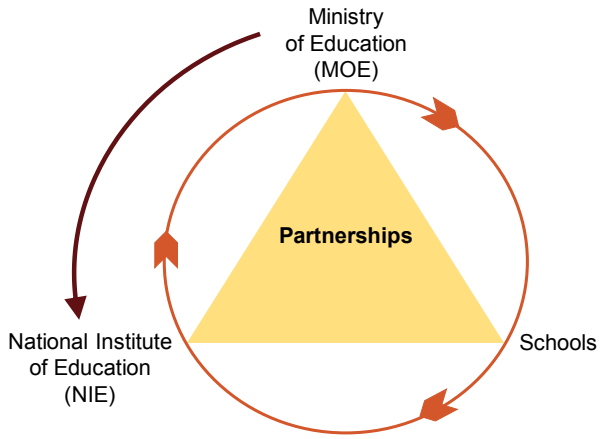
NIE assumes substantial responsibility for the effectiveness of teaching and teachers within schools. This mandate covers all aspects of teachers' skills and attributes and extends to the placement of teachers within schools.

While the relationship between NIE and the Ministry is productive, NIE is not afraid to prevent the Ministry from filling a vacancy in a school if they consider the teacher is not of a sufficient standard. NIE will take a stand to prevent a teacher of insufficient standard teaching in a school in Singapore.

[133] Ibid.

[134] National Institute of Education (2009)

Figure 10: Enhanced Partnership Model



Source: (National Institute of Education, 2009)

Incentives for NIE

The financial incentives for NIE (and their academics) are aligned to the continual improvement of school education. This alignment is created through:

- A cap on the number of initial teacher education students coupled with strong requirements for quality education.
- Substantial funding for school-based research that must aim to improve student learning.
- An academic promotion system that rewards contributions to school education.

Many teacher education institutions (and the universities in which they are situated) must enrol as many people as possible into their teacher education courses to remain financially viable.[135] As a consequence, concerns can arise about the quality of the program, the courses offered, and the graduates themselves.

In contrast, NIE has no financial imperative to get more students into their teacher education course. The enrolment numbers are set by the Ministry and the substantial research funding keeps NIE financially viable. In addition, continual feedback on the quality of the teacher education courses (see below) ensures that high quality initial teacher education is provided to a fixed number of students.

NIE receives substantial research funding from the Ministry that is closely tied to the objectives of the Ministry of improving school education. Research funding for NIE for 2008-2013 totalled $SGD 100 million (EUR 60 million / USD 78 million).[136] Funding is divided into basic research and school practice streams. The school practice research must be linked to key school education issues (as specified by the Ministry of Education, with input from schools) and thus keeps NIE focused on the core work of improving student learning in schools.

In addition, decisions on grants larger than $SGD 100,000 (EUR 60,053 / USD 77,658) require a Ministry representative on the committee that assesses applications for research funding. Those

[135] Labaree (2008), Philip, *et al.* (2009)
[136] Grattan Institute interviews at National Institute of Education and Ministry of Education, Singapore (2011)

over $SGD 2.5 million (EUR 1.5 million / $USD 1.9 million) require Ministry and Permanent Secretary approval.[137]

Academics in NIE are rewarded for their direct contributions to improving school education. NIE has succeeded in ensuring that their academic promotion system rewards research publications, teaching effectiveness, and school-based research.

They have succeeded in managing the requirements of both their parent university, Nanyang Technological University, and the Ministry of Education. Importantly, standards have not lowered. Instead, high standards are now applied to both school-based research and more traditional academic research such as publishing in academic journals. The impact of academics' research in schools is measured in numerous ways such as:

- Feedback from schools, the Ministry, and parents.
- The extent that the findings of their research (such as new educational programmes or new approaches to teaching and learning) have been adopted by schools.
- Influence on education policy.

Effective teaching is also part of academics' promotion within NIE. It is measured through a number of mechanisms including: the use of innovative and engaging teaching approaches (including the effective use of interactive digital media), student ratings, and peer evaluation.[138]

As a consequence, assessment and promotion decisions are often a more authentic measure of the impact of education research than a strict focus on traditional science and technology indicators such as citation indexes.

Assessments of academics feed into different career tracks that have been developed for faculty. Staff can join the research or teaching track, with the weights for research, teaching, and community/professional service modified depending on the track. For example, promotion decisions for staff in the research track have equal weight given to research and teaching. Staff in the teaching track have the highest weight given to teaching, with less emphasis on research and other dimensions.

7.4 Key features of implementation in Singapore

Develop feedback loops that feed into the continual development of initial teacher education: feedback from schools, teachers, and other stakeholders should continually re-focus initial teacher education on school students' learning. Feedback from teachers, schools and the Ministry of Education led NIE to remove many electives such as the philosophy and history of education, and curriculum and assessment design to concentrate resources and have the necessary time for the development of core practical classroom teaching skills.

[137] Grattan Institute interviews at National Institute of Education and Ministry of Education, Singapore (2011)

[138] Grattan Institute interviews at National Institute of Education, Singapore (2011)

Form a strong relationship between the Ministry of education, schools and teacher education institutions: ensure alignment of objectives and progress to maximise the benefits of effective collaboration. In Singapore, key features of the tripartite relationship are:

- The Ministry and NIE have a joint focus: the learner and improving the quality of education. The Ministry selects teacher candidates and the NIE is the sole provider of teacher education.
- Links between the partners are facilitated by secondment of classroom teachers to both organisations.
- Links between the Ministry and NIE are also maintained through secondments: Ministry officials currently comprise about 15% of the teaching/academic staff at NIE.[139]
- Senior representatives from the Ministry and NIE are required to attend weekly strategy meetings of the other institution and are aware of the day-to-day developments in each organisation.[140]
- Involvement of high-level Ministry officials (Permanent Secretary, Director of Schools etc) in various stages of the process (entrance interviews for teacher candidates, grant funding decisions for NIE faculty) is a clear signal of the importance placed on this relationship and the link between the partners.
- Constant feedback and evaluation on the program allows for changes to the curriculum and structure of the training to better suit school and Ministry needs; conversely, the NIE can inform policy and practice with relevant research.
- Strong links to each school facilitate effective practicums and ensure that the 10-week final practicum is relevant and useful for teacher candidates. In addition, the practicum acts as a screening mechanism for schools to assess potential teachers.
- The tight involvement of the Ministry allows for a systemic approach to professional learning that is often missing in teacher development. For example, it ensures strong links between pre-service and in-service teacher education.

Align the incentives for teacher education institutions to the objectives of school education: incentives for both institutions and academics need to be aligned. Incentives should focus on ongoing improvement to the quality of initial teacher education, graduates from these courses, and of school education more generally. Reform in Singapore to the funding of initial teacher education institutions and the promotion system for academics in these institutions provide key examples.

7.5 Implementation: reform in Korea

Korea provides an important example of reforms undertaken to improve teacher initial education in larger education systems with multiple providers. Korea has experienced considerable growth in the number of initial teacher education providers in recent years. Concerns over the quality of all of the courses offered has

[139] Ibid.
[140] Op Cit 138.

increased. Both national and private providers exist in Korea's 43 teacher's colleges, 55 University Departments of Education, 160 University teacher education courses and 136 Graduate Schools of Education. These institutions provide teachers for around 11,000 primary and secondary schools.[141]

Growth in the number of courses and institutions offering initial teacher education is not exclusive to Korea. Nor are concerns about the quality of initial teacher education courses offered.[142] For policy makers considering these questions, Korean reform provides an example of how these issues can begin to be addressed. Two specific reforms and programs are discussed: the evaluation and development of teacher education institutions and the use of teacher examinations.

7.5.1 Evaluation and development of institutions

Like many education systems, there has been concern in Korea regarding both the quality of initial teacher education and the mismatch between the supply and demand for teachers.[143] To help address these issues, the evaluation and development of teacher education institutions has recently been reformed.

The most recent reform has meant that the evaluation of teacher education courses has much greater consequences on the courses and the institutions that provide them.

Objective and context

Reform to the evaluation and development of initial teacher education aimed to improve both the quality and quantity of teaching graduates. Strong growth in both the number of institutions offering initial teacher education and the number of courses offered has led to concerns of an oversupply of teacher graduates in Korea.[144] Concerns are magnified by a declining birth rate that is forecast to reduce the number of students (and therefore the required number of teachers) in Korean schools.[145]

These developments are connected to concerns over quality, with the excess supply of graduates creating opportunities for greater assessment and improvement of teacher education courses.

The Korean Ministry responsible for school education has considerable control over initial education for primary teachers (only ten institutions provide initial primary teacher education in Korea), but less so for initial education of secondary teachers. The Ministry sets some requirements on the curriculum for teacher initial education.

An evaluative system has been in place since 1998, with teacher education institutions evaluated every five years.[146] But, given increased concerns over quality, the most recent round of evaluations were much more comprehensive and had a greater impact on education institutions. The reforms gave the most recent rounds of evaluations (in 2010) considerable 'teeth'.

[141] Park, S. "Teacher Policies in Korea", World Bank presentation, 22 June 2010
[142] OECD (2005), OECD (2010c)
[143] Korean Educational Development Institute (2007)
[144] Grattan Institute interviews at Korean Educational Development Institute, Korea (2011)
[145] Kim and Han (2002)
[146] Ibid.

How does it work?

The Korean Educational Development Institute (KEDI) was given the operational responsibility for the national evaluation of teacher education institutions. KEDI, along with several prominent education academics, developed the evaluation criteria, and they organise the teams who evaluate initial teacher education courses and the institutes that run them.

To illustrate how the evaluation operates, there are four steps to the evaluation of the courses offered by Colleges of education:[147]

1. December – the Colleges are informed of the focus of the evaluation and how it will operate, with a large focus on self-evaluation. In the following months, each College undertakes a self-evaluation and collects the information required under the guidelines supplied by KEDI.

2. May – Each College submits their self-evaluation report to KEDI for analysis by the expert teams assembled. The analysis highlights issues and raises questions to be followed-up during site visits.

3. June – The expert teams visit each College and undertake an evaluation. Two groups visit each College. The first (consisting of four people from KEDI and academics from other institutions) undertakes an evaluation of the accuracy of the self-evaluation. The second group (the size of which varies depending on the size of the College) evaluates the practical teaching offered by the College. The groups operate simultaneously, conducting interviews, observations and collecting quantitative data, and normally complete their evaluations in one (sometimes very long) day.

4. August – KEDI collects all information and data collected during each phase of the evaluation process. It then collates the findings and determines final gradings which are sent to the Colleges and to the Ministry.[148]

Focus of evaluations

A detailed assessment criteria rates each course and institution out of 1000 points. It focuses on three areas:

1. Management and environment.

2. The program offered.

3. Outcomes.

Within each of these areas, sub-categories are identified that contain specific criteria and indicators (each of which have a pre-determined weighting).

Management and environment includes the development of the program over time, the teaching staff, facilities (including practicums and the use of model classrooms) and general administration and financial management. Within these categories are 18 criteria that total 450 of the total 1000 points that make up the overall rating.

[147] Grattan Institute interviews at Korean Educational Development Institute, Korea (2011)

[148] Korean Educational Development Institute and Ministry for Education Science and Technology (2011)

The *teaching program* focuses on the management and organisation of the curriculum; the specialisation and experience of academics teaching the courses; the learning environment; and, connections with schools and other education institutions. These categories attempt to address the quality of teaching provided to teacher education students and provide clear pathways for education institutions to improve their ratings.

Box 7.4: Evaluation of teacher education courses - teaching staff indicators

The criteria for the evaluation of initial teacher education focuses on three areas, each of which include numerous indicators that are weighted according to their importance. As an example, the indicators for the evaluation of the teaching staff for an initial teacher education course are:[149]

- Number of full-time teaching staff for major mandatory subjects (relative to the number of students) (80 points).
- Number of full-time teaching staff for elective school subjects (40 points).
- Number of full-time teaching staff for subjects in Education studies (50 points).
- Number of lectures conducted by full-time teaching staff (10 points).
- Percentage of full-time teaching staff and their experience in the education institution or any other related institution (10 points).
- Salary of temporary teaching staff (20 points).
- Research outcome per full-time teaching staff (40 points).
- Percentage of full-time teaching staff participating in programs for understanding the learning environment of schools (20 points).

Outcomes include those during and after students complete their initial teacher education. There are seven indicators in this area that total one-quarter of the points that make up the overall rating for the course. The seven indicators are:

- Drop-out rate of students (10 points).
- Enrolment rate of students (20 points).
- Senior students' readiness for school classes (60 points).
- Strictness of graduation criteria for postgraduate students (60 points).
- Rate of employment at schools after graduation (60 points).
- Current students' satisfaction (60 points).
- Graduates' satisfaction (40 points).

Policy makers in other systems may consider that they would like to focus on additional elements or place a different weighting on specific aspects of initial teacher education. But the focus of evaluations in Korea provides an important example of reform implementation. It is up to policy makers in each system to

[149] Ibid.

consider the applicability of these reforms to their systems and, in particular, which aspects are more (and less) suited to their needs and context.

Results

A significant change from previous rounds of evaluations of teacher education institutions is that the most recent round had 'teeth'. There were substantial consequences - both positive and negative - for the institutions offering initial teacher education. Subsequently, the latest round was more comprehensive, taken more seriously by education institutions, and has already led to some significant changes.

Grades are awarded ranging from A-D to each initial teacher education institution. While these are initially provided to the institutions and the Ministry, they are also made public. Rankings are published in newspapers, providing important information to all stakeholders.

In the latest evaluations, only eight Colleges of education received an A rating.[150] For this achievement they receive a substantial financial reward. Institutions that are awarded a B rating receive no such rewards, but neither is there a negative impact. By contrast, C and D grades result in substantial cutbacks to the education institutions. The Ministry sets the number of places that each initial teacher education institution can provide in each course. If a course receives a C rating, then student numbers in that course will be reduced by 25% the following year. If a D rating is provided, then student numbers are reduced by 50%.[151]

In many countries (including Korea), such reductions would result in the course being closed. Not surprisingly, appeal processes are in place for institutions receiving low ratings.

The appeal process is, in practical terms, an opportunity for institutions to improve their courses to reach a grade of B or above. Institutions can choose to have their enrolment cut or be re-evaluated. If they do not achieve a B rating on the re-evaluation, then enrolments are cut according to the initial grade.[152]

The re-evaluation process gives institutions one year to develop their course(s) to meet the required standards. The re-evaluation focuses on areas that were considered poor in the initial evaluation.[153] Substantial changes have already occurred. Some institutions have introduced new curriculum, others have hired new professors and increased the quantity and quality of resources devoted to teacher education. At the same time, some institutions have accepted the low grade and the decrease in enrolments or cut the course completely.

[150] Grattan Institute interviews at Korean Educational Development Institute, Korea (2011)

[151] It is important to note that institutions can receive different grades for different courses. For example, an institution can receive a B rating for its under-graduate programs and a C for its post-graduate program.

[152] Grattan Institute interviews at Korean Educational Development Institute, Korea (2011)

[153] Different guidelines have been developed for re-evaluations that focus on areas of improvement and the requirements for achieving an improved rating.

Impact

While it is too early to assess the overall impact of this program, it has already led to substantial change. The program has emphasised the importance of high-quality initial teacher education at a time when it has not received the attention it perhaps should in many systems.

The increased emphasis has caused a shake-up at many institutions. Substantial development programs have been initiated and additional funds have been invested. In so doing, it has increased the profile and resources devoted to teacher education in some universities.

The program has also increased information flows between the institutions, schools, the Ministry and potential teachers.[154] All can see the ratings that various courses have achieved and this informs decisions about whether to attend particular courses or hire specific teachers.

While there are some concerns that the evaluative process is not sufficiently developmental, substantial improvements have already been made as institutions try and achieve high ratings. In addition, the extra resources granted to highly effective teacher education institutions will see them expand and spread best practice. Other programs also appear promising.

Box 7.5: Greater resources in education faculties

Education faculties are not normally the recipients of large amounts of funding in universities. Education often loses out to science, medicine, engineering and other faculties that often receive more resources in the internal allocation of funds within universities. Korean universities are no different. But their evaluation program has brought some changes in specific universities.

Education faculties know when the evaluation is coming, its focus, and its possible impact (both positive and negative), which provides an impetus for education faculties to revamp their programs and improve their faculty. Several education faculties have received more funding from their university central administration to improve their facilities, hire new staff and professors, and increase their talent pool.

The Ministry sent a clear signal that under-investment in teacher education would not be tolerated. Institutions could no longer get away with providing part-time or casual lecturers that were cheaper than highly effective professors. The consequences are now very transparent.

Learning from the best institutions

It is important to marry comprehensive evaluation with effective development. In education terms, it is crucial, but often difficut, to emphasise both the formative and summative aspects of assessment and evaluation. Important programs have been developed to spread best practice and further improve initial teacher education.

[154] Grattan Institute interviews at Korean Educational Development Institute, Korea (2011)

In the 2010 (the most recent) round of evaluations, only eight Colleges of Education were granted an A rating. These are the institutions providing the best initial teacher education courses in Korea. Additional funds are provided to these institutions to enhance and expand their teacher education programs.

The Ministry asked all A rated institutions to develop a framework for a model curriculum of teacher education that would provide an example for all institutions to follow.

In March 2011, each of the eight institutions were asked to develop a framework for a specific aspect of the curriculum to be submitted to the Ministry in early 2012. The Ministry will then decide whether they should develop a more detailed 'model' curriculum.

It is clearly too early to tell whether this program will be effective in improving initial teacher education across Korea. But it is a potentially important element of a system of evaluation and development that creates continual learning for teacher education institutions. In addition, it increases the dialogue and strength of the relationship between the Ministry and the initial teacher education institutions (and potentially amongst the education institutions themselves) which, as we have seen in Singapore, is crucial in increasing the effectiveness of teacher education.

7.5.2 Entrance examinations to become a teacher in Korea

Objective and context

Entrance examinations into the teaching profession provide another implementation mechanism to reform and develop teacher education institutions. Korea has a three-stage examination process that teacher education graduates must pass before they can teach in schools.[155]

Making graduates pass examinations before they can teach in schools is a clear mechanism to ensure specific standards must be met to become a teacher. But it is also an important mechanism for policy makers to influence and develop teacher education institutions and the course they provide.

Just as assessments of school students influence curriculum and pedagogy in school education, examinations to enter the teaching profession influence curriculum and pedagogy in teacher education institutions. If policy makers want to emphasise particular skills or knowledge of particular areas, these elements can be emphasised in entrance examinations. Doing so then 'pulls' teaching in teacher education institutions to provide their students with these knowledge and skills. On a number of occasions, Korean teacher education institutions have adapted the courses they offer in response to changes made by the Ministry of Education to teacher entrance examinations.

[155] Korean Educational Development Institute (2009)

How does it work?

After graduating from a teacher education course, a three-stage examination process must be passed before becoming a teacher in a Korean public school:

1. Multiple-choice examination on various aspects of education and pedagogy.
2. Examination requiring longer written responses (essays and responses to problem-solving questions) that focuses on content knowledge and both general and subject-specific pedagogy.
3. A teaching demonstration in front of an expert committee including academic experts and school leaders.

The first examination has a pass-fail outcome, with only a pre-determined number of students passing to the second and third examinations. The final two stages are assessed to provide a final score for graduates. The teaching demonstration provides a practical example to complement the written responses in the second examination.

Results

The Ministry sets the number of graduates they will pass each year that corresponds to the number of teaching vacancies. In general, the number of graduates that pass the first examination are roughly double the number of vacancies. That number is then halved after the second and third examinations so that the number of graduates who pass all three examinations is equal to the number of vacancies.[156]

Importantly, the examinations are difficult with only about 23% passing and obtaining a teaching job over the last four years. This increases the impact of the examinations. If they were simple and everyone passed, then they could be relatively ineffectual. Their large impact on students increases the pressure on initial teacher education institutions to respond to the focus (and changes in that focus) of the examinations. Students will not want to attend institutions whose graduates are not able to pass the examinations.

There have not been substantial changes to this examination process in recent years but leading academics at teacher education institutions report that even minor changes lead to changes in the courses they offer. For example, in recent years there has been a greater emphasis on the teaching demonstration (the third examination) as demonstration was considered a better assessment of teachers' ability to improve student learning. This small change has lead to commensurate changes in many of the courses offered in Korea to better prepare their students for the examination.[157]

[156] Korean Educational Development Institute (2009), Grattan Institute interview at Korean Educational Development Institute, Korea (2011)
[157] Grattan Institute interview at Korean Educational Development Institute, Korea (2011)

8. School principal education

Highlights

To build a flexible pool of highly talented school leaders requires they be continually challenged and developed. In Singapore:

- Extensive appraisal and feedback means that teachers with leadership potential are identified at an early age and fast-tracked into leadership, training and positions.
- Extensive interview and assessments must be passed before entering school principal education.
- A challenging executive education program develops transformative leaders.
- School principals are rotated into different positions every five to eight years. It is considered that this is the time period when they will have a maximum impact on a school.

Objectives and context

Effective school leadership raises student expectations and performance by increasing the capacities of teachers and developing effective practices. As leaders, they can shape school climate and environment. Effective school leadership can improve the efficiency and equity of school education and individual learning.[158]

Yet many countries struggle to create a systemic school leadership practice. Local areas of excellence are difficult to scale-up, and characteristics of high performing individuals are difficult to build into the system more broadly.

Box 8.1: A disconnect between policy and the classroom - attracting effective school principals

In many OECD countries there are decreasing numbers of applications for leadership positions. Posts often have to be re-advertised for lengthy periods of time because no suitable candidate have come forward. In some cases, the number of applicants per post has drastically declined over the past decades (OECD, 2008).

Effective school leadership requires a demanding set of competencies that include personal and professional leadership skills, professional skill knowledge, and financial and human

[158] Pont, *et al.* (2008)

resource management. Leadership for learning, and for building a school leadership practice that works to help all students achieve their best, is not an easy task.

In Singapore, school principals are considered the key to school transformation.[159] In order to effect this transformation, school leaders have to rethink practices and innovate continuously to keep getting the best from their staff and schools. Singapore has been running an executive education program since 2000 in order to equip their school leaders with these skills.[160]

8.1 How does it work?

Highlights

- Potential principals undertake a six month (full-time) Leaders in Education Programme (LEP). The program is focused on elements of leadership and critical self-reflection rather than technical administration.
- The course includes a fully sponsored two-week visit to an international educational institution to broaden their learning experience.

Selection of school leaders

Potential school leaders do not self-select, but rather are nominated by the Ministry in discussion with schools and principals. When teachers enter the teaching force, their potential and performance are tracked - through appraisal, feedback and development (see Chapter 12) - from the first day of their teaching. By the time they have been teaching for about 10 years, the Ministry is in a good position to assess whether or not individuals are good candidates for leadership positions within schools.

Executive education candidates have several interviews with senior administrators and Ministry officials, including the Director of Schools.[161] They also must pass a series of situational tests. Once nominated, candidates are placed on a leadership track, which is distinct from the teaching track (see Chapter 12).[162] After this process – but before they are promoted or posted - they take part in a 6 month (full-time) program and continue to develop their skills as they are placed in schools and throughout their careers.[163]

The Leadership in Education Program

The Leadership in Education Programme (LEP) was launched in 2001 and is run by the National Institute of Education (NIE) in Singapore. It is a six-month full-time program for selected vice-principals and Ministry officials.[164] The focus of LEP is not on technical administration skills but rather elements of leadership, critical self-reflection, and integrating experiences and beliefs that can be used throughout their careers.

[159] Ng (2008)
[160] Grattan Institute interview at Ministry of Education, Singapore (2011)
[161] Ibid.
[162] OECD (2009c), Grattan Institute interview at Ministry of Education, Singapore (2011)
[163] Grattan Institute interview at Ministry of Education and National Institute of Education, Singapore (2011)
[164] National Institute of Education (2011)

LEP takes in 35-40 individuals each year, and runs from March to September. Participants receive full salary and tuition fees are covered by the Ministry. Participation in the six month full-time course is required before principals are posted to their school.

Key elements of LEP

LEP's focus is not on technical administration skills, but rather elements of leadership, critical self-reflection, and integrating experiences and beliefs that can be used throughout their careers. In addition to coursework and talks, the program includes international and industrial visits. For all of these activities, the emphasis is on critical thinking and professional dialogue. The aim is to construct knowledge as a group and as an individual.

1. Modules and interaction

Participants take part in a series of modules. All modules combine research elements with discussion on day to day practice. Modules include:[165]

- *School leadership, vision and culture* - crafting a personal philosophy of leadership through reflections on school leadership, the moral dimension of principalship, and daily work of principals.
- *Educational leadership through complexity lense*s - understanding complexity and the rapid nature of change; avoiding simplistic or reductionistic management.
- *Contemporary strategic management* - management and business strategies, evaluation of competitive advantage of schools, branding and choice.
- *Design thinking: innovation and values* - creating new value for organisations and people, using design thinking tools and technologies, accelerating innovation.
- *Evaluation and assessment* - evaluating, rethinking, and restructuring assessment practices. Includes assessment design, standards, formative and summative assessment tools.

Participants are given a chance to interact with educational and industrial leaders. Each year, the Permanent Secretary, Director General of Education, and Director of Schools all teach a session on the program. The former Director General of Education also runs school leadership case studies in the program. Industry leaders are involved in interactive sessions designed to give participants exposure to the commercial world and the types of decision-making and managing strategies available.

2. International and industry visits

LEP includes a fully sponsored two-week international visit where the participants have an opportunity to visit a range of educational institutes and other organisations. Participants and their tutors use observation and conversation to challenge their thinking and assumptions. The goal of such visits is not to import good practice wholesale into Singapore. Young leaders have to analyse and scrutinise their approach to education and help them think outside of their immediate culture and experience. On return to

[165] Ibid.

Singapore, each group presents their experience and lessons to fellow educators. There is also an International Visit Report for dissemination to other educators in Singapore. This knowledge dissemination is also used as an opportunity for more critical thinking and analysis.

In addition, LEP participants take part in an industrial visit, where small groups meet with senior executives of multinational corporations based in Singapore. The aim of such meetings is to expose the participants to different ways of thinking about leadership and decision-making. After the visits the participants discuss their experiences and also record their reflections in a journal. Journal keeping is an integral part of self-reflection, and is heavily used in this program.

3. The 'Creative Action Project'

Group learning is also crucial element of LEP. In the Creative Action Project groups of about six students work together to build innovative models of schools and learning.[166] Each participant is attached to a school where they work on an innovation project as part of an action learning approach. They are asked to imagine the school 15 years in the future, and to develop a project based on issues for that school. For example, projects in 2011 included work on 'Design Thinking for arts education', and 'personalised learning in a globalised and heterogeneous society'.[167]

[166] Ibid.
[167] Grattan Institute interview at Ministry of Education and National Institute of Education, Singapore (2011)

Other key design elements

- The program is challenging. Participants must devote their full attention to it and discontinue all other work commitments.
- Mentoring programs are part of the course but can continue throughout leaders' careers. The development of school leadership skills is understood to be a process that will last throughout their career and is not simply a product of this six month course.
- Continual feedback ensures graduates have the right skills. The program is evaluated through a survey of school principals as well as feedback from the Ministry and current participants. This feedback is used to make changes to the content and structure of the course over time.

Matching leaders to the right schools

The Ministry selects high-potential candidates and matches them with a particular post based on their style of leadership and the needs of the school.[168] This matching is important as the starting point is the school: which schools would benefit most from different sorts of principals.

It also recognises that school principals have strengths and weaknesses. Some leaders will be transformative and therefore ideal leaders of schools in need of reform. Other leaders will be more suited to consolidating recently reformed schools. Others will be ideal for schools in disadvantaged communities. It is based on the needs and timing of the school that the nomination of

[168] Grattan Institute interview at Ministry of Education, Singapore (2011)

individuals is made. It is always the aim that all school principals will have a good range of skills that have been developed in different contexts. But, like all organisations, realistic decisions should be made.

As participants are matched to particular schools, they are not always appointed immediately on completion of the course. For example, they might be posted initially as a Vice-Principal while they are waiting for the current principal of their matched school to retire. Upon retirement of the principal, they are then appointed to that position.[169]

Challenging careers with on-going support and development

The formal leadership program is followed by continuous mentoring, peer group learning, and ongoing professional development, with the aim of supporting long-term change in real-life settings.

The Academy of Principals of Singapore (APS)[170] provides the platform for mentoring over the long-term once the individual is in their leadership post. In addition, there are two other mechanisms for building continuous learning for leadership:

- In-service education courses and programs at the NIE, including conferences, discussion groups, and research projects.
- Strategic self-organisation. Much of LEP operates through small groups and project work, which require self- and group organisation. These groups continue after the program, transforming into an unofficial support network. Networks have been called a “social safety net”, where principals feel free to ask questions and seek help in solving difficult issues from their peers, without fear of judgement.

[169] Ibid.
[170] www.aps.sg

8.2 Key features of effective Implementation

Highlights

- Feedback loops were crucial for effectively developing principal education. In developing the course, the NIE began by asking the Ministry about the skills, weaknesses and development requirements of existing school principals.
- Identifying and fast-tracking school leaders – extensive teacher appraisal and feedback is required to identify potential leaders. Career structures have to be flexible to target development to potential leaders.
- Providing incentives to take part. School leaders have a heavy responsibility to their staff and students. Financial and non-financial rewards must be built into the system to attract those best suited. A key incentive is the on-going professional development and change in positions every five to eight years.

Feedback loops are required for initial development of school education… In developing the course, the NIE began by asking the Ministry about the skills, weaknesses and development requirements of existing school principals. Based on this information, and in conjunction with feedback from the ministry, the program was developed to complement the long-term strategy for building a culture of leadership.

…and on-going improvements – A strong relationship between the Ministry, schools, and NIE keeps school leadership education up to date and in line with evolving policies and school needs. In Singapore the Minister, Permanent Secretary, Director of Schools, Director General and ex-Director General all teach on the leadership program.

Establish mechanisms to identify and screen school leaders – Extensive teacher appraisal and feedback systems are vital for identifying leadership capabilities. Fast-tracking young leaders creates a dynamic system, and allows for targeted development.

Set flexible and challenging roles for school principals – A deliberate strategy of post rotation after a set period of years in a particular school helps develop a flexible pool of highly talented leaders. Opportunities for growth (in other schools, in policy positions or other organisations) demonstrate a commitment to a highly professionalised cadre of school leaders. ‘Fiefdoms’ (for example, an autonomous school leader in one post for more than ten years) are often counter-productive and can keep schools and leaders from new opportunities.

Engage external stakeholders to develop school principals – Flexibility and high-quality school leaders require challenging development that takes them out of their comfort zone. Singapore offers an executive education with training in other industries and countries. External organisations and partners should be engaged to develop a course with universal (as well as specific) leadership skills that are transferable between school education and other sectors.

9. Induction and mentoring

Highlights from Shanghai

- All teachers have mentors, not just beginning teachers.
- Feedback based on classroom observation is frequent, connecting induction and mentoring programs to student learning. For example, middle level teachers observe mentor lessons once a week. Mentoring is an explicit component of a teacher's job description and a requirement for promotion.
- Outstanding teachers are given additional mentoring responsibility in other schools. Good teachers are not promoted out of the classroom, they are promoted into more classrooms.
- Beginning teachers have multiple specialist mentors, covering subject-specific skills and classroom management issues.
- Teachers invest substantial time in mentoring and induction, made possible by trade-offs, incentives and setting clear expectations.

While many countries have induction and mentoring programs, many are often not done well.[171] When implemented effectively, they set the foundation for a career of continuous professional learning.[172] Effective induction and mentoring programs help to attract and retain high-quality teachers by providing the constructive feedback and development that teachers need. Effective reform of mentoring programs is particularly important given that many countries struggle to retain early career teachers.

This chapter discusses effective induction and mentoring programs in Shanghai, and the development of induction in Hong Kong.[173] It outlines how these programs affect student learning, then describes in detail how they operate. It also highlights key implementation considerations useful for other education systems.

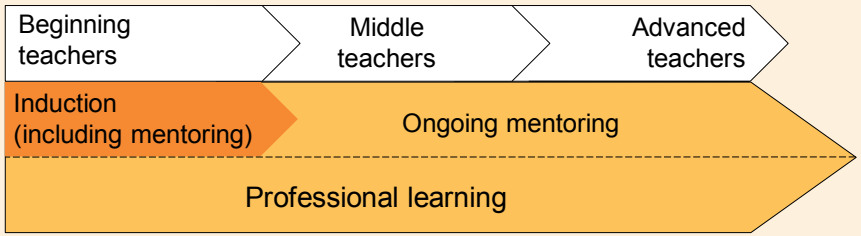
[171] OECD (2008) Teaching and Learning International Survey (TALIS) data
[172] Rockoff (2008)
[173] This chapter focuses on induction programs for qualified new teachers employed within schools. However, induction to school settings first occurs in initial education within practical school placements. This aspect is discussed in Chapter 7 on Initial Education.

Box 9.1: Differences between induction and mentoring

The terms induction and mentoring are often used interchangeably, but there are large differences between them.[174]

Induction is usually associated with beginning teachers, while mentoring is considered an important part of professional learning for all teachers throughout their careers.

Induction programs include mentoring, but also include training and structured support systems, school orientation programs, and a variety of professional development opportunities.[175] By contrast, mentoring programs often emphasise one-on-one relationships with different coaches.



9.1 Objective: what is the impact on learning?

Mentoring is a vital form of professional learning that improves student learning. Mentors model instruction in authentic school settings and provide one-on-one coaching, known to have a positive impact on student learning.[176] Both mentor and mentee undertake critical reflection on how learning can be improved.

Evidence shows that outcomes only significantly increase if the programs are intensive, with regular interactions over sustained periods of time.[177]

Box 9.2: A disconnect between policy and the classroom - mentoring programs

In many countries, mentoring programs fail to provide the constructive feedback necessary for teacher development and improved learning. There is a disconnect between the objectives and policies of programs put in place to improve teaching, and the behavioural change required in schools.

OECD TALIS data from 2008 shows that across TALIS countries there is little difference in the frequency of feedback received by teachers in schools, regardless of whether a mentoring program is in place.[178]

Induction programs can help beginning teachers develop effectively in the early years of their career. Developing the next

[174] Smith and Ingersoll (2004)
[175] Ibid.

[176] OECD (2011a)
[177] Smith and Ingersoll (2004);Rockoff (2008)
[178] OECD (2010c)

generation of teachers improves student learning now and in future.

Successful induction programs provide comprehensive training and support, not just mentoring. A variety of induction experiences help beginning teachers develop in different areas, with advice from different people. New teachers quickly develop by seeing effective instruction modelled in a range of settings, and having various support networks in place for their short and long-term needs.[179]

Importantly, induction and mentoring strengthen a culture of professional learning across the school. For new teachers, it is the first phase of in-service training within a continuum of professional learning. It makes it easier for teachers to collaborate and exchange ideas. Learning from other teachers introduces new teachers to the collective learning nature of the profession. Early collaboration is particularly important for policy makers and educators wanting to develop a culture of continuous professional learning.

Research shows that effective induction and mentoring programs can increase the job satisfaction, effectiveness and retention of new teachers.[180] In many OECD countries, up to a third of teachers resign or burn out in the first three to five years of teaching.[181]

[179] Wong (2004), Pain (2010)
[180] For example: Holloway (2001), Wilson, *et al.* (2001);Fuller (2003)
[181] OECD (2010c), OECD 2004, 2005 cited in Ewing and Manuel (2005)

9.2 Mentoring in Shanghai: how it works

Highlights

- Mentoring is for all teachers, not just new teachers.
- Mentoring focuses squarely on the basics of teaching and learning, not just administrative and emotional support. It concentrates on diagnosing student learning, subject-specific pedagogy, research and classroom management skills.
- The intensity of teacher engagement in mentoring is a large part of its success.
- Exemplary teachers become mentors at the District level, and mentor one-on-one as well as groups of mentees.

In Shanghai, mentoring is a major part of professional learning for all teachers. From beginning to experienced teachers, all are expected to continuously improve.

> *"Mentoring in Shanghai is a part of daily life"*
>
> *Dr Zhang, President Shanghai Normal University, Learning from the Best: a Grattan Institute Roundtable, 2011*

Mentors may be teachers at the school, a key teacher or subject-leader at the District level, a Master Teacher, a well regarded scholar, or a researcher brought into the school. Beginning teachers typically have two mentors, one for classroom management and one for subject-specific guidance.

Box 9.3: Master Teachers mentor in Shanghai

Master teachers have the highest status in Shanghai. Only 0.2% (or approximately 200 teachers) in Shanghai have this status at any one time.[182] Master teachers mentor many teachers across many schools to share their experience and expertise. They not only mentor one-on-one, but also provide workshops for groups of teachers.

Key design features

While mentoring programs vary depending on teacher seniority, school and District, a number of common design features are identified below.

- *Diagnosis of mentee needs*: mentoring relationships usually begin with a comprehensive diagnosis of mentee strengths and weaknesses (see Figure 11 for a sample diagnosis form from Gezhi High School).

  What is assessed in the mentor's diagnosis reveals a lot about what is emphasised in mentoring, and about a teacher's role in Shanghai and across China. Mentees are assessed on, "education thoughts and concepts", "ideas for education reform" and "research in teaching and learning", among other things. The emphasis on leading research and reform is significant. Teachers are relied on to improve the education system over time. Performance as a mentor also determines promotion possibilities.

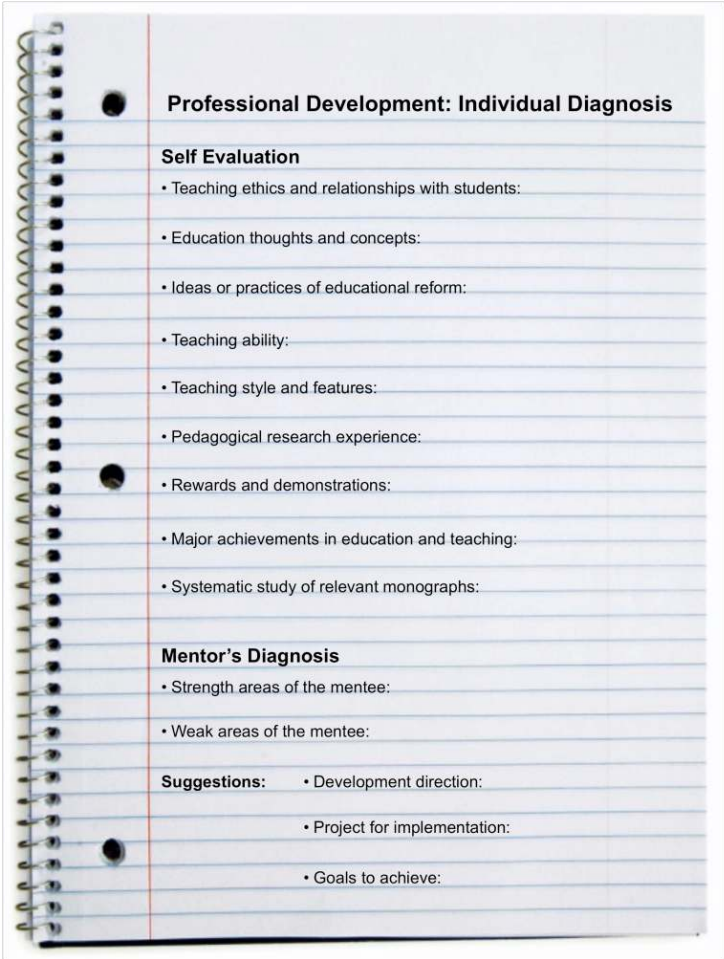
  The diagnosis includes specific development directions for the mentee. These become central to the mentoring relationship and are used to produce the mentee's development plan. In experimental schools, these plans last for up to three years.

- *Classroom observation:* mentor and mentee observe each other's lessons, as well as public demonstration lessons. Mentees frequently observe mentor lessons then write up reflections. Mentors observe mentees teaching and give immediate feedback on areas for improvement.

- *Demonstration classes*: mentees also deliver demonstration classes at the school or District level, depending on their level of seniority and capabilities. Mentors then provide constructive feedback and mentees submit a class profile. This principle includes a record of the teaching design, comments from mentors and other experts, as well as a self-evaluation of their performance.

[182] Grattan Institute interview at Shanghai Municipal Education Commission, (2011)

Figure 11: Diagnosis Form: individual professional development



Source: (Gezhi High School, 2009)

- *Research projects*: mentors focus on developing research capabilities and guide mentees in research projects undertaken at school or District level. At Gezhi High School, mentees publish research papers in academic journals at District and Municipal levels under the guidance of their mentors.[183]
- *Lesson planning*: mentors guide mentees in preparing lessons, developing teaching plans and discussing how to make improvements.
- *Record of learning:* mentees usually record what they have learnt through the mentoring program, detailing case-studies of student learning and articulating their own personal teaching style.

Unlike many systems, exemplary teachers are given more responsibility in mentoring a significant number of other teachers outside of their schools and across the system (see Box 9.4).

Box 9.4: District-level mentoring - promoting outstanding teachers into more classrooms

In Shanghai, effective teachers are not confined to their own classroom, nor promoted into administrative roles. Their professional skills are spread across multiple classrooms, benefiting many students and teachers. The most effective teachers mentor other teachers (and groups of teachers) across a wide range of schools in the District. They spend time in other classrooms, providing feedback that increases student learning and teachers' abilities.

[183] Gezhi High School documentation

Group mentoring at District level

As well as one-on-one mentoring, distinguished teachers also provide practical workshops to groups of mentees across a number of schools in the District. In Huang Pu District, more than 40 distinguished teachers lead subject-based workshops with groups of mentees, teaching them critical reflection and research skills.[184] Mentees learn directly from the best teachers in the profession.

More recently, the District undertook a new approach to have the best teachers conduct training in school settings. Mentors observed and critiqued mentee lessons with the group, and demonstrated effective practice in the school setting.[185]

Case-study: Mentoring at Gezhi High School, Shanghai[186]

Gezhi High School runs an exemplary mentoring program. All the school's teachers are mentored and mentor others during their careers. Gezhi's mentoring guidelines state:

> *"[mentoring] requires every teacher to keep learning and exploring in teaching and research, and to reach higher innovative teaching methods..."*

Table 5 shows the school's three tiers of mentoring relationships, from beginning to advanced teachers, including the frequency and intensity of activities in each tier.

In the first tier, beginning teachers are mentored by multiple senior teachers. New teachers are expected to observe their mentor lessons at least twice a week, and write up at least one teaching reflection of classroom observations each week. They are also required to deliver one demonstration class at the District level, lead a research project, and publish a paper in a formal academic journal within the three year mentoring period.

In the second tier, teachers with more than five years of experience are mentored by District level teachers. They are expected to observe one of their mentor's classes each week, and deliver two demonstration classes each term at school and District level, and publish two papers in municipal academic journals.

In the third tier, the District key teachers or subject leaders are mentored by Master level teachers. They are not expected to observe or write teaching reflections, but carry out three demonstration classes at District level each term. They are also expected to publish at least three papers in municipal academic journals, as well as a monograph.[187]

[184] Teacher Training Institute of Huangpu District, Shanghai, documentation
[185] Ibid.
[186] Gezhi High School documentation

[187] Monographs are scholarly detailed essays on a specific topic, typically with dense information and designed to be read by people in the field.

Table 5: Intensity of mentoring at Gezhi High School, Shanghai

Teacher seniority →

	Tier 1	Tier 2	Tier 3
Mentee:	**Beginning Teacher < 5 yrs experience**	**Teacher > 5 yrs experience**	**District Key Teacher / District Subject Leader**
Mentor:	Senior Advanced Teacher	District Key Teacher / District Subject Leader	Master Principal, Master Teacher, Researcher
Number of mentors	Two	One	One
Observe mentor classes	Twice a week	Once a week	N/A
Complete a teaching reflection	At least once a week	At least once a week	N/A
Deliver demonstration class	Once a term	Once a term at (i) school (ii) District level	Three times a term at District level
Lead research project	One project	At least one project at District level or above	At least one project at District level or above
Publish papers in academic journals, with relevant academic proofs	One; in District academic journal	Two; in Municipal academic journal	At least three; in Municipal academic journals
Professional development case study	At least 4000 words	At least 4000 words	At least 4000 words
Summary personal teaching features	At least 4000 words	At least 4000 words	At least 4000 words
Teaching / research awards	At least one at school level or above	At least one at District level or above	At least two at District level or above
Publish monograph	N/A	N/A	At least one
Mentee mentors others	N/A	N/A	Mentor teachers with > five years of experience

Source: Gezhi High School documentation

9.3 Induction in Shanghai: how it works

Highlights

- In Shanghai, induction involves multiple specialist mentors, as well as various other opportunities including research and grade groups, research projects, networks across the District, and a requirement to give demonstration lessons.
- Incentives to engage in induction are explicit. Teachers must not only increase the learning of students but of their colleagues. Developing new staff is a core part of a teacher's job description and a criterion for promotion.
- Members of research and lesson groups play a large part in the development of beginning teachers.

In Shanghai, teaching is a collective and collaborative profession. Induction plays an important role in introducing new teachers to this culture.

> *"The development of beginning teachers impacts on school sustainability, so it is the indispensable responsibility of our school..."*
>
> *Li Da Middle School Documentation (2012)*

Mentoring is a major component of induction programs, along with participation in at least two structured learning communities, such as 'research groups' and 'lesson preparation groups'. These collaborative working groups are a key part of a new teacher's development.

Through this package of support, new teachers are grouped with other teachers. Their teaching is frequently observed. They are continually exposed to teachers who analyse what works and support each other. These program design features are critical in bringing about the desired behavioural and cultural changes required in the classroom to improve learning and teaching.

Induction activities

While programs vary between schools and Districts, common induction activities include:

- *Multiple specialist mentors.* Each beginning teacher has two mentors in the school: one to develop subject-specific teaching skills, the other to advise on classroom management. Beginning teachers jointly prepare lessons with their mentor, and frequently observe the mentor's lessons to see effective teaching practice. Mentors observe mentee lessons and provide immediate feedback.
- *District-based mentoring*. Experts are brought in to schools to provide coaching. They can be researchers, academics, or leading or distinguished teachers. They team up with beginning teachers, help to develop lesson plans, observe classes and give feedback.

Box 9.5 : Multiple mentors at Gezhi High School, Shanghai

Gezhi High School is a high-performing, select-entry school with an intensive induction program. Beginning teachers have two mentors, and observe two or more of their mentor's classes each week. New teachers try to see as many mentor classes as they can to observe effective practice.[188]

- *Research groups.* New teachers join research groups made up of teachers of the same subject (e.g. maths teachers). These groups introduce new teachers to the action-research nature of teaching. Beginning teachers are exposed to teachers' trialling new ideas together, learning from each other, as well as the professional dialogue between teachers in the school. Senior teachers give special attention to developing new teachers and make specific suggestions for training and support (research groups are further discussed in Chapter 10).
- *Lesson preparation groups*. These small groups are made up of teachers of the same subject and same year level (for example, Year 8 maths teachers). Group members guide and support each other in lesson planning and design, with a focus on developing new teachers' skills in these areas (lesson groups are also discussed in Chapter 10).
- *District-level courses, workshops and seminars.* Districts offer centralised training that typically covers basic teaching skills. These include how to deliver lessons, prepare for lessons and examinations, classroom management skills and education reform concepts. In some courses, training promotes understanding of reforms in new policies.[189] Keynote speeches are delivered by experts, famous teachers, affiliated school leaders, course leaders, and experienced researchers.
- *District-based lesson demonstration.* Beginning teachers view exemplary public lessons given by experienced teachers in the District. Beginning teachers deliver public lessons to other teachers across the District, and receive feedback.
- *Action-research projects.* Beginning teachers undertake research projects to develop their teaching skills. At Gezhi High School new teachers lead at least one research project, and also publish a paper in a formal academic journal. Mentors oversee mentees' research projects and provide advice and assistance as needed.[190]
- *Teaching competitions* are organised at the District level to motivate beginning teachers to study effective teaching and learning. New teachers deliver classes and demonstrate their abilities to others. They can also receive awards for outstanding achievement. In Huang Pu District awards are given to the top 20% of beginning teachers in the competition.[191]

[188] Gezhi High School (2011) documentation

[189] Teachers Training College of Huagpu District, Shanghai (2009) documentation

[190] Gezhi High School (2011) documentation

[191] Huagpu District, Shanghai (2009) documentation

Tailored approaches

Teachers who struggle in the early years receive further support. At Li Da Middle School, the principal gives such teachers special attention.[192] He or she arranges with the teacher's mentors to conduct one-on-one coaching, giving constructive feedback on the teacher's teaching style as well as other professional advice.

New teachers are expected to learn through the repeated cycle of "study-practice-analysis and restudy-repractice-reanalysis."[193] This process involves teachers studying what is good teaching, demonstrating it in the classroom, receiving constructive feedback from observers, reflecting again, then adjusting practice to improve student learning.

Beginning teachers in Li Da Middle School who display outstanding potential are given opportunities to excel. Opportunities include participating in research programs, and delivering demonstration classes at the District level.

Completing induction

Some Districts have a pass/fail assessment in order to qualify as a 'formal' teacher. Assessment includes an appraisal of the beginning teacher's progress throughout the course.

In Huang Pu District, beginning teachers must complete a number of steps to 'pass' induction.[194] New teachers must complete a training manual, present a progress report, as well as undergo an appraisal by their teaching group. The school leader also prepares a report.

In order to qualify as a formal teacher, two examinations need to be passed, one by the Teacher Training Institute of the District and the school. These examinations are in addition to undergraduate qualifications. Finally, applications must be approved by the District Education Bureau.

On completion, schools often provide induction ceremonies involving deans, department heads and head teachers.

9.4 Implementation

Chapter 5 identifies implementation as the key element of effective education strategy. Policy makers and educators wanting to improve induction and mentoring might consider the following points on implementation, after considering whether they apply to their system.

In many systems, improving induction and mentoring is likely to require substantial cultural change in schools. Behavioural change is possible. It has succeeded in many schools in many systems, but only if it is made a feature of reform and particularly of implementation.[195] Cultural change can occur in schools over time, if the system elects to:

Make trade-offs, create incentives and set expectations - Induction and mentoring must be intensive to have a meaningful impact on students and on attracting, developing and retaining effective teachers. To develop effective programs policy makers in

[192] Li Da Middle School (2012) documentation
[193] Ibid.
[194] Huangpu District Teacher Training Institute (2011)documentation
[195] Jensen and Reichl (2011)

Shanghai have made several decisions to free up teachers' time and create incentives for them to engage:

- Teachers teach larger but fewer classes giving them significant amounts of time to engage in induction and mentoring.
- Time spent in mentoring contributes to hourly requirements for professional learning. Beginning teachers include induction time in their 240-hour training requirement.[196] Half of all professional learning is expected to take place at school.[197]
- Mentors and mentees have special professional development opportunities in some schools. For example, at Gezhi High School teachers who join a mentoring program are given funds for publishing papers, time off to complete activities, higher education opportunities, access to promotion, upgrading degrees, outbound study, overseas project research and refresher training programs.
- Experienced teachers are expected to share skills and knowledge as a core part of their job. In Shanghai, a teacher's contribution to induction and mentoring is evaluated and influences decisions on promotion.[198] Greater input of other teachers in 360-degree feedback is also beneficial. These practices both contribute to and reflect a culture of intensive professional collaboration and learning in schools.

Establish a mix of induction activities - A variety of learning experiences produces well-rounded development. In Shanghai, induction involves mentoring, professional learning communities, demonstration lessons, research projects and competitions at the District and school level.

Introduce new teachers to professional learning communities - Teachers need to be introduced into environments of peer collaboration and to be given opportunities to join learning communities that will support and guide their development. In Shanghai, new teachers learn from being part of two structured learning communities, 'research groups' and 'lesson preparation groups'. Senior teachers in this group provide extra guidance to new teachers.

Establish classroom observation as a key tool - Teachers should observe each other's classes to form the basis for discussion and analysis of effective learning and teaching within induction and mentoring programs. In Shanghai, observation is a critical part of these programs. Teachers observe mentors, their peers, and teachers outside the school.

For countries seeking to overcome resistance to observation, Hong Kong reforms may be relevant.

[196] Shanghai Municipal Education Commission (2011) documentation received 13 December 2011
[197] Grattan Institute interview at Shanghai Municipal Education Commission (2011)
[198] Ibid

9.5 Implementation of induction reforms – a Hong Kong case study

Highlights

- Hong Kong's Induction Tool Kit began as a pilot over two years, with ongoing adjustments to program design based on feedback from teachers and other stakeholders.
- The Tool Kit requires that induction include classroom observation that required a behavioral and cultural change for many teachers in Hong Kong.
- The Tool Kit gives detailed guidance on how to effectively implement induction programs, with specific proformas that schools can use and adapt for all aspects of implementation.

While Shanghai is the gold standard in induction, policy makers may find Hong Kong's reforms useful from an implementation perspective.

Hong Kong does not have a long-established system of induction, but it has been a focus of reforms since 2003. Implementation of reforms has focused on creating behavioural and cultural change in schools. This case-study also illustrates how reform was undertaken within the autonomous school system of Hong Kong.

Key steps in implementation of induction reforms

Choosing a strategic objective and identifying required changes

In 2003, the Advisory Committee on Teacher Education and Qualifications identified induction as a key area for reform. Two task forces, subsequently established, conducted in-depth study on international good practice. Their analysis focused on how induction needed to operate to improve learning and teaching.

This work formed the basis for the initial design of an 'Induction Tool Kit' (the Tool Kit). The Tool Kit is a voluntary guide that helps schools to plan and implement school-based induction schemes. It sets out the required behavioural change to take induction to where it needs to be. It incorporates classroom observation and feedback explicitly as key implementation tools. It highlights the importance of teachers working in a collaborative school environment where they share knowledge and skills, observe mentees, and give constructive feedback.

Box 9.6: Hong Kong's 'Induction Tool Kit' - how it works[199]

The Tool Kit focuses on the first year of a teachers' work experience and recommends a range of learning experiences for well-rounded development. It links to Hong Kong's Teacher Competencies Framework, establishing induction as the first phase in the continuum of teacher development.

The Tool Kit outlines expectations for new teachers' support and training. All new teachers should have a mentor who is either subject-based, a supervisor, or another teacher. Induction should operate in an environment encouraging collegiality and reflective practice. Administrative arrangements, including the allocation of free periods and physical space in the staffroom, should enable regular interaction and exchange of information between mentors.

The Tool Kit requires that new teachers must, among other things:

- Conduct lesson observation with peers or mentors, with discussion before and after the observation.
- Reflect on the effectiveness of teaching on student learning, using case studies of student development.

The Tool Kit encourages all new teachers to reflect and analyse their own and others' lessons, and analyse a case of student development. They are expected to express their teaching philosophy, and to conduct self-evaluation.

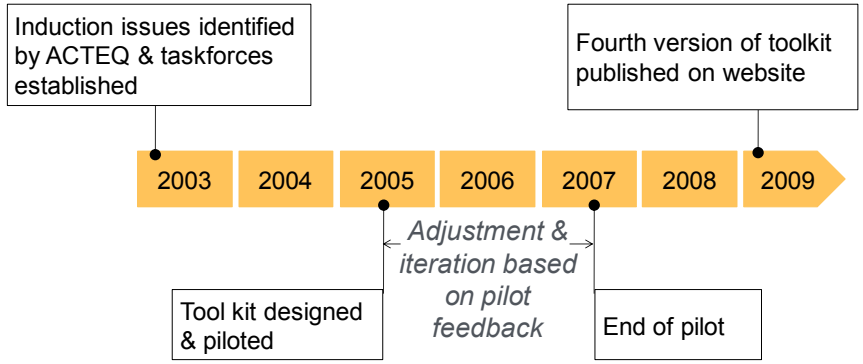
Schools should use the scheme for teacher appraisal. It is designed to empower, not regulate, beginning teachers.

[199] Education Bureau (2011e)

Establishing a group of champions

The Tool Kit was tested first in 2005/06 to 2007/08 in more than 70 schools in three phases (see Figure 12).[200] It was adjusted based on feedback from the trials. Piloting the design was an important step in championing support for the new reform.The Tool Kit is currently in its fourth version (released in 2009). Even today, the Advisory Committee on Teacher Education and Qualifications and the Education Bureau work with schools, education professionals and teacher education institutes to iteratively review the induction scheme.[201]

Figure 12: Timeline of Tool Kit development



School leaders and teachers are free to exercise their professional judgment in implementing the Tool Kit. As many schools already have induction programs in place, the Tool Kit

[200] Advisory Committee on Teacher Education and Qualifications (Undated)
[201] Education Bureau (2007b)

helps schools to refine their existing scheme where relevant. It is designed to be used flexibly, acknowledging that schools have different induction programs that vary according to local needs. These features increase teacher ownership of the reform.

Engagement strategy and capacity building for implementation

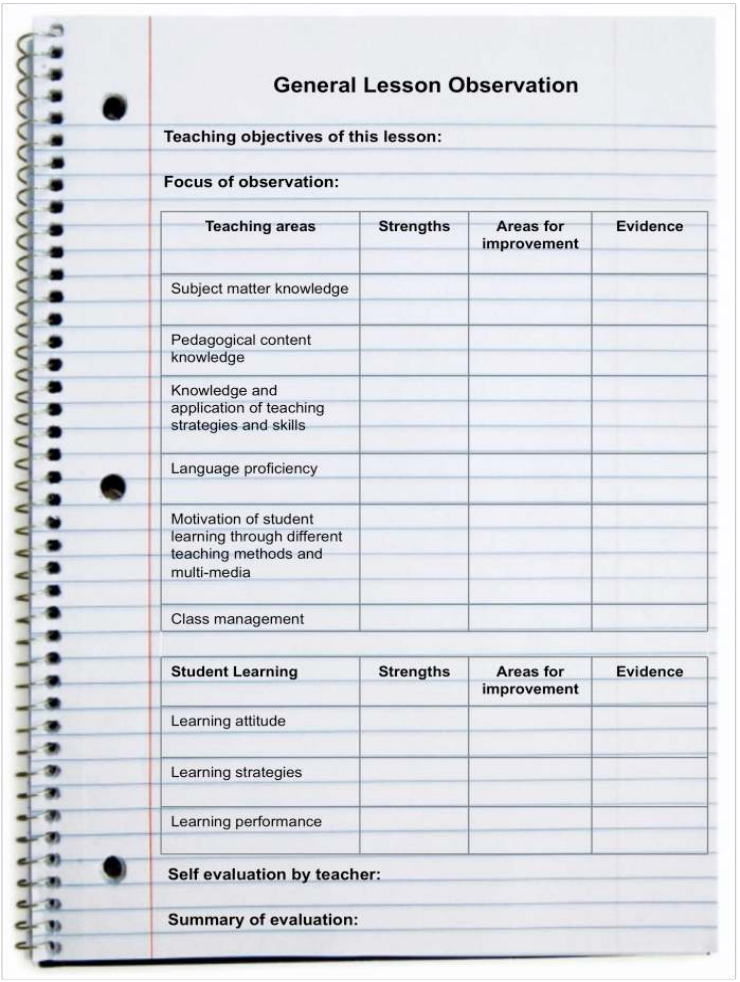
To bring schools on board with reforms, the general release of the Induction Tool Kit in 2009 clearly explained the rationale and objectives, as well as the piloting process to date. It set out expectations of how schools could use the voluntary guide.

There were substantive briefing sessions and workshops to introduce the Tool Kit to schools. Networks were established to help schools share findings on successful implementation. Online discussion forums are also used to exchange professional experience in implementing the program.

In addition, the Tool Kit provides detailed templates to guide school leaders and teachers in implementation.

For example, the Tool Kit's pro-forma on classroom observation reflects the evidence on effective classroom observation. It requires that observations focus on students: teaching is observed through the lens of student learning (see Figure 13). This focus links the program to Hong Kong's overall objective of improving student learning.

Figure 13: General lesson observation form



General Lesson Observation

Teaching objectives of this lesson:

Focus of observation:

Teaching areas	Strengths	Areas for improvement	Evidence
Subject matter knowledge			
Pedagogical content knowledge			
Knowledge and application of teaching strategies and skills			
Language proficiency			
Motivation of student learning through different teaching methods and multi-media			
Class management			

Student Learning	Strengths	Areas for improvement	Evidence
Learning attitude			
Learning strategies			
Learning performance			

Self evaluation by teacher:

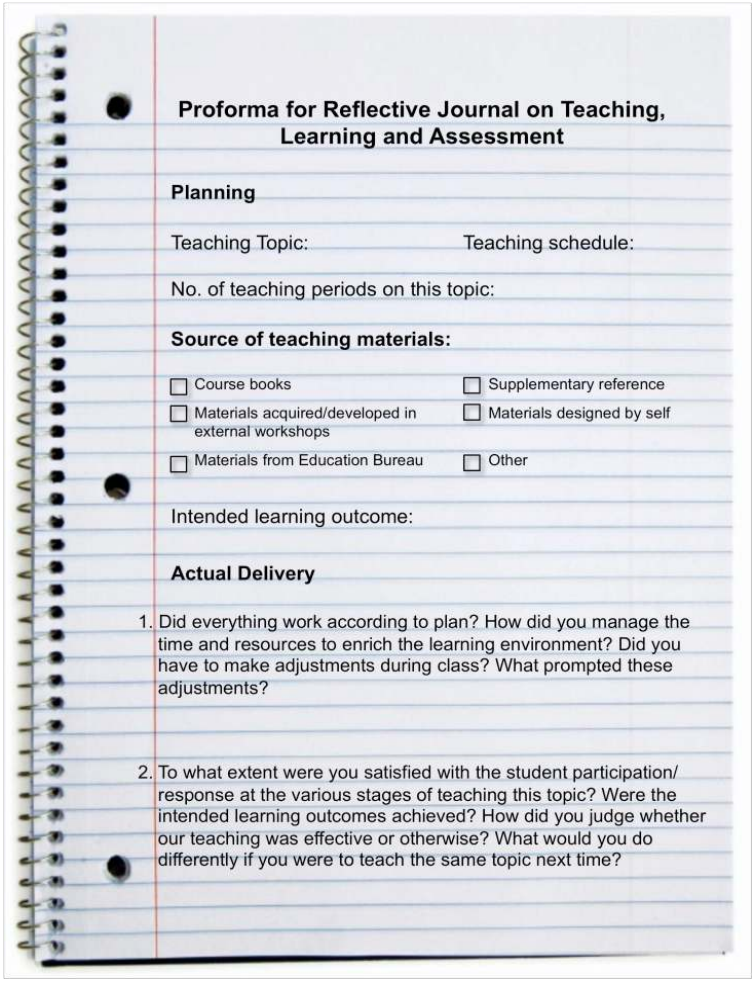
Summary of evaluation:

Classroom observation is just one of more than 15 proformas, covering:

- Reflective journals entries (see Figure 14).
- Induction planning.
- Case-studies on student development.
- Personal statements on philosophy of education.
- Reflection on teaching practice (see Figure 14).

The Tool Kit advises that documentation be kept as brief and concise as possible. The templates indicate the level of detail expected. What counts is the quality of the learning of the mentees, not the volume of paperwork.

Figure 14: Reflective journal entry



Proforma for Reflective Journal on Teaching, Learning and Assessment

Planning

Teaching Topic: Teaching schedule:

No. of teaching periods on this topic:

Source of teaching materials:

- ☐ Course books
- ☐ Supplementary reference
- ☐ Materials acquired/developed in external workshops
- ☐ Materials designed by self
- ☐ Materials from Education Bureau
- ☐ Other

Intended learning outcome:

Actual Delivery

1. Did everything work according to plan? How did you manage the time and resources to enrich the learning environment? Did you have to make adjustments during class? What prompted these adjustments?

2. To what extent were you satisfied with the student participation/ response at the various stages of teaching this topic? Were the intended learning outcomes achieved? How did you judge whether our teaching was effective or otherwise? What would you do differently if you were to teach the same topic next time?

Figure 15: Example action plan for key tasks

Activity	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.
Mentor /mentee conference	1st conference		2nd conference		3rd conference		4th conference		5th conference		6th conference
Lesson observations by mentee		At least one lesson observation by mentee and follow-up discussion				At least one lesson observation by mentee and follow-up discussion					
Lesson observations be mentor/peer		At least one lesson observation by mentor/peer and follow-up discussion				At least one lesson observation by mentor/peer and follow-up discussion					
Interim review				Mentor and mentee to complete Interim review. Formal meeting between mentor and mentee							
Personal statement on philosophy of education	Mentee to complete Section A of relevant Proformas for mentor's comments		Mentee to engage in ongoing reflections and revisit his/her statement of educational philosophy in Section A based on work experiences					Mentee to complete Proforma for mentor's comments			
Reflective journal on teaching, learning and assessment	Mentee to examine with mentor to identify teaching topics as focuses for professional reflection		Follow-up on relevant issues					Mentee to complete Proforma for mentor's comments			
CPD activities	Mentee to record all CPD activities undertaken and complete Sections A and B of relevant Proforma									Mentee to complete section C of relevant Proforma	
Case studies on student development	Identify issues on student development for in-depth investigation in at least one case study and follow through the investigation and self-reflection with support from mentor and colleagues							Mentee to complete Section A of relevant Proforma fro mentor's comments			
Final review											Mentor and mentee to complete final review

10. Research and Lesson Groups

Highlights

- In Shanghai, all teachers participate in at least two structured, formal professional learning communities. Much of a teacher's development takes place in these learning communities.
- Research and lesson groups meet frequently, in some schools between one to two hours a week.
- Teaching is recognised as a research-oriented profession, and peer-reviewed published research is a requirement for promotion.

In Shanghai, 'teaching and research groups' (research groups) and 'lesson groups' are integral components of professional learning. Both involve classroom observations, constructive feedback to teachers, strong professional collaboration and school-based research – all shown to have significant impacts on student learning.[202] These groups play a pivotal role in connecting a strategic objective of improved learning and teaching to the required behavioural and cultural changes in each classroom.

This chapter discusses the impact of research and lesson groups on learning. It describes how the programs operate, highlighting key lessons and implementation steps for policy makers and educators to consider. In Section 10.4, a discussion of key implementation steps also draws on the development of professional learning communities in Singapore.

Box 10.1: What is meant by 'research' and 'lesson' groups in Shanghai?

Research groups are comprised of teachers of the same subject across a school (e.g. maths teachers). This group conducts school-based research to improve student learning through improved and often innovative teaching. It explores teaching and pedagogical theory and applies it in the classroom. Teachers support each other in trialling new ways of working to improve student learning.

Lesson Groups involve teachers of the same subject and same year level (e.g. maths teachers of Year 8 students). They are typically smaller versions of research groups. Group members work together to plan lessons, examine student progress, and devise upcoming teaching content.[203]

10.1 Objective: what is the impact on learning

Research and lesson groups improve student learning by providing forums for teachers to learn from each other's

[202] Hattie (2009)

[203] In addition to research and lesson groups, there are also 'grade groups' which are made up of teachers with students in the same year level. They coordinate issues relevant to the whole year, which are usually more administrative in nature; for example arranging student activities and exam schedules. Grade groups not explored further in this chapter.

experience and skills. Studies show that teachers who exchange ideas and coordinate practices report better teacher-student relationships, a significant predictor of student achievement.[204]

Collaborative working groups help bring about change in the classroom, given that a powerful incentive for change is face-to-face relationships. People are more likely to make fundamental shifts in teaching when they are exposed to ideas, practice new behaviours, observe others practising those behaviours, and when they are being observed and want to be seen as successful.[205] Groups can establish a system of peer monitoring and lateral accountability, where teachers who are lagging behind others can see and reflect on what good teaching practice is.

Learning communities have been shown to impact on school culture and lead to increased involvement, ownership, innovation and leadership among teachers.[206] They can enhance professionalism and prevent stress and burnout.[207]

Research-based learning communities provide a forum to translate research into practice in the classroom. Teachers work together in exploring new ways of working based on theory, strengthening the link between theory and practice.[208] Research groups and communities increase the professional status of teachers as practicing researchers.

[204] OECD (2011), Bolam, *et al.* (2005)
[205] Elmore (2004)
[206] Berry, *et al.* (2005), Andrews & Lewis (2002) cited in Sargent and Hannum (2009), Phillips, (2003), Supovitz & Christman, (2003) cited in Sargent and Hannum (2009)
[207] Rosenhotlx, (1989) Clement and Vandenberghe, (2000)cited in OECD (2009b)
[208] Christianakis (2010)

Box 10.2: The disconnect between policy and the classroom – teachers' professional development

OECD TALIS shows teacher development is often not suited to teachers' needs. One-off courses are often provided even though teachers believe (and the evidence shows) that longer term individual and collaborative research opportunities have the greatest impact. While 90% of teachers in TALIS 2008 countries would like to participate in research opportunities, only around one third do so.[209]

"In the US...The problem [is that] there is almost no opportunity for teachers to engage in continuous and sustained learning about their practice in the settings in which they actually work, observing and being observed by their colleagues in their own classrooms and classrooms of other teachers in other schools confronting similar problems of practice".[210]

[209] OECD (2011a)
[210] Elmore (2004) cited in Fullan (2006)

10.2 Research groups in Shanghai: how they work

Highlights

- Research groups produce research papers published in academic journals.
- Exemplary teachers present research group findings in open lessons at the District level.
- Research and lesson groups are integrated into school structures; in professional learning, promotion as well as administrative structures (for example, timetabling, physical space).

Research Groups are an example of teaching being recognised as a research-oriented profession. They have been operating across China since the 1950s and exist in formal structures in every school.[211] Teachers are relied on as practising researchers to improve the education system over time.

At the outset, teachers themselves decide what the group should research to improve student learning. Typically, the group leader sets the research topic in line with teacher interests. The one condition is that the research must be aimed at improved student learning. The group explores the literature on this topic, but spends the majority of time trailing new ways of working in the classroom. As research group members all teach the same subject, they explore subject-specific teaching methods in depth.

Group members meet frequently to explore their research topic, and observe each other's lessons in testing different approaches. There is usually a pre-lesson discussion on lesson plans, as well as post-lesson discussion on teaching content and methods and the impact on student learning.

While practice varies between Districts, teachers generally observe between six and eight lessons a semester of other group members; most teachers observe more.[212]

> *"From what I have seen in Western countries, teachers' place of work is the classroom - with students coming and going. In Shanghai, teachers' main place of work is their office. The emphasis is on their professional learning and research."*
>
> *Ms Xu Hong, School Principal, Shanghai Experimental School*

Senior members are expected to mentor and guide junior teachers in the group. They help identify problems and development needs, and then recommend specific training programs.

Research groups vary to some extent between schools and Districts. Research groups in Huang Pu District provide an illustrative example.

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

[212] Huang Pu District Teacher Training Institute (2011)

Research groups in Huang Pu District, Shanghai[213]

In Huang Pu District, research groups play a key role in teacher professional development.

Group members are expected to:

- Complete at least one group research project every two semesters;
- Meet formally at least five times a semester, with fixed time, venue and topic;
- Conduct at least six classroom observations of other group members each semester; and
- Participate in at least four group organised class researching activities.

Members are expected to promote the achievements of the group and to produce at least one paper (each) based on discussions. Every semester, at least one-third of teachers within the group should deliver open classes, as outlined in Table 6.

Teachers are encouraged to publish papers or monographs in the District level and Municipal level publications. They are also expected to read one to two professional publications or books on teaching theory. Where possible, teachers should participate in District level symposiums on research. Exemplary teachers may present research reports and/or deliver an open lesson at the District level on their research findings.

Table 6: Research groups, Huang Pu District

Research Groups, Huang Pu District	
Research projects	At least one every two semesters*
Group meetings with venue and topic	Five times a semester
Classroom observations	At least six a semester
Group organised activities	Four a semester
Participate in District activities	All members required
Read publications / books	One-two a semester
Produce paper on reflections / experience	At least one by each member
Deliver open class	30% of group members must deliver once a semester
Publish research papers / monographs	All members encouraged
Deliver teaching research or open class lessons to District	Members encouraged

**There are usually two semesters a year in Shanghai*

[213] Ibid.

Case Study: research groups in Shanghai Experimental School[214]

Shanghai Experimental School (SES) is a high performing research-oriented experimental school. SES is attached to Shanghai Education Commission and its experimentation and research are supervised by the Shanghai Teachers University.

Research groups at SES typically meet once every two weeks for 1.5 hours. The group sets an annual research question based on learning in the school. Members spend the first two months undertaking a literature review, and the remaining ten months of the year in the classroom trailing the application of evidence-based theory. Master and advanced teachers lead less experienced teachers through the process.

The group produces a formal research paper, often shared with new teachers and other schools. The paper provides an opportunity for group members to consolidate what they have learned, developing their competencies as action-researchers.

Research group meetings are scheduled in the timetable, and teachers have 'offices' for their research. There is also physical space in the staffroom to collaborate with colleagues.

System-level Research groups

In Shanghai, research groups exist not only in schools but also at District and Municipal government levels.[215] The Shanghai Municipal Education Research Office and Districts conduct their own research to explore ways to improve teaching and learning across the system.

In addition, networks of schools work together to coordinate and improve their research capabilities. These networks help schools to share resources on high quality research, as well as coordinate training on common issues and needs.

Box 10.3: Research networks in Huang Pu District[216]

In some Districts, groups of schools form research networks to build teacher research capabilities. For example, in Huang Pu District, there is a research union of 13 schools. High performing schools in these networks share research resources with other schools to help raise the quality of research-oriented teaching. One school typically leads the research union and coordinates research-based training activities for other schools.

10.2.1 Lesson preparation groups – how they work

Lesson planning is a key focus in China. Lesson planning groups work together in discussing, observing and analysing the lessons of each teacher in the group. Teachers discuss upcoming work and ways to tackle the content of next week's classes.

Group lesson planning helps improve student learning as teachers jointly reflect on diagnosing student learning, lesson design and teaching approaches. Teachers discuss alternative teaching approaches, observe each other's classes, re-examine content, and identify and solve problems in teaching the

[214] Grattan Institute Interview at Shanghai Experimental School (2011)
[215] Grattan Interview with Shanghai Municipal Education Commission, (2011)
[216] Huang Pu District Teacher Training Institute (2011)

content.[217] Groups can pool resources in lesson planning to reduce individual teacher workload and free up time for reflection and discussion on learning.

> *"[In Shanghai] teachers try to work collectively, and they do so in order to get feedback".*
>
> *Dr Zhang Minxuan, President Shanghai Normal University*[218]

In Huang Pu District, lesson planning groups are required to develop a semester long teaching plan together.[219] The group is expected to work together to identify key questions and challenges in teaching the subject, and to then develop solutions to these challenges. Group members are expected to meet five times a semester with a fixed time, venue and topic. Teachers observe the lessons of other teachers and then jointly reflect on how learning could be improved.

These groups provide an important vehicle to address inequality. Teaching is discussed in the context of meeting each student's learning needs. Students that are falling behind – whose learning needs are not being addressed – are quickly highlighted. Different approaches are tried with required additional efforts to quickly bring students back up to speed.

[217] Kennedy (2005)
[218] Zhang (2011)
[219] Huang Pu District Teacher Training Institute (2011)

10.3 Implementation

Policy makers wanting to improve research and lesson groups could take the following points on implementation into consideration.

Not all of these will be applicable in all contexts and institutional settings but, following the discussion throughout this report, policy makers and educators can consider the following and their applicability to their education system.

Make trade-offs and allocate resources to key drivers of student learning: if the objective of a reform is to improve student learning then the next step is often to improve teaching. Intense professional collaboration has been shown to have a significant impact on teaching effectiveness and classroom learning. In Shanghai, there are separate groups (research, lesson planning, and administration). All create intense professional collaboration and professional learning.

Time is required for effective research and professional collaboration, and tradeoffs must be made to reflect this need. As discussed in Chapter 3, Shanghai has made a number of trade-offs to free up teacher time.

Recognise teaching as a research-oriented profession: teachers should be relied on to research and explore ways to improve learning. Research should be incorporated into a teacher's job description, given opportunities for collaborative research, and recognised for research achievements. Teachers should be encouraged to produce research reports and to publish research articles. Research not only helps their own professional

learning, and that of other teachers, but also helps raise the status of the profession. In Shanghai, research achievements are part of requirements for promotion. Promotion to advanced and Master teacher status requires published papers.[220]

Classroom observation as the norm: is an important step in developing the cultural change required in many education systems. In Shanghai, classroom observation is undertaken frequently and underpins how research and lesson groups function. For discussion on how Hong Kong re-established observation see Chapter 11.

Structural support: provide groups with timetabled sessions and necessary infrastructure (e.g. physical meeting, online platforms). Teachers' offices can be considered places of research and professional learning. [221]

10.4 Implementation – Reform in Singapore

Some policy makers may feel the need to develop school-based action research skills before implementing research groups in schools in their education system. Singapore provides an important example of implementation programs for school-based research that policy makers and educators in other systems may wish to consider.

Set the objective and identify required behavioural change

Singapore's *Teach Less Learn More* philosophy aimed to improve pedagogy to develop 21st century learners. The development of professional learning communities in Singapore sought to help achieve this goal. However, there was an identified need to develop teachers' research skills before communities could be successfully implemented to bring about the required behavioural and cultural change in the classroom.

A program was developed to ensure that at least one teacher in every school could undertake evidence-based research in schools. This person would then lead research in their school and share and develop the research skills of their colleagues in professional learning communities.

Establish a group of champions and an engagement strategy

The Ministry discussed the need for these research skills with the National Institute of Education (NIE) and both now play a role in this program.

Not only does collaboration build research skills in school education, it allows policy makers to shape these skills. As discussed in Chapter 7, the Ministry of Education in Singapore and the NIE are in constant dialogue, sharing information, ideas and making requests about education reform. In this case, the Ministry identifies the research skills they want teachers to develop – the requirements for effective school-based action research – and NIE develops a program that will provide teachers with the skills to produce evidence-based research outcomes that can be used to improve learning and teaching in schools.

[220] Grattan Interview with Shanghai Municipal Education Commission, (2011)
[221] Grattan Institute interview at Shanghai Experimental School, (2011)

Box 10.4: How Singapore's research skills program works

The program requires teachers to work in the Ministry for 2 days per week for a given period and National Institute of Education (NIE) provides a training course on school-based action research. The course requires teachers to attend NIE for 3 hours per week for 8 weeks. During this period, teachers undertake action research in their school and, with the guidance of NIE, present their findings at the end of the course. Teachers are trained in evidence-based action research in schools and the practical nature of the course increases school-based research across schools in Singapore.

Those who have graduated from the course play a vital role in effective professional learning communities. The professional learning communities meet for 1 hour per week in schools. Multiple groups operate within schools, with teachers choosing the group that suits their own interests (e.g. specific aspects of curriculum, pedagogy, or professional interests).

Box 10.5: School-based action research in Yusof Ishak Secondary School, Singapore.

Professional learning communities in Yusof Ishak Secondary School in Singapore meet for one hour per week and conduct evidence-based research on a variety of topics aimed at improving learning in the school.

After completing time in the Ministry and training with NIE to develop their school-based action research skills, their research follows a clear eight step procedure:

1. Identify key learning issues.
2. Develop action research plan.
3. Pre-test students on specified area of learning.
4. Develop and try new pedagogical techniques.
5. Conduct peer observation to share and further develop pedagogy and classroom practices within the professional learning community.
6. Conduct a post-test of the students in their classes (normally at the end of a term or specified research period. In some cases, it may take a full school year).
7. Evaluate impact on students.
8. Review the effectiveness of the new pedagogy (or curriculum).

If the evaluation shows positive results on student learning then it is incorporated into the teaching throughout the school. If the evaluation is not positive, then the professional learning community undertakes further analysis to try and analyse why. Can it be improved? Or should something else be considered the following year to improve student learning?

The School Principal, Mr Richard Chew Soon Kheng, encourages innovation and is continually pushing teachers to think differently about their teaching to better understand the complexities of student learning and to develop teaching skills throughout the school. For him, research is a key method to improve learning through the continual development of pedagogy and improved teaching practices in the school.

11. Classroom observation

Highlights

- Teaching is an open profession in Shanghai, where teachers regularly observe other teachers (mentors, peers, exemplary teachers) in the school *and* District.
- Observation and constructive feedback is fundamental to the operation of many professional learning programs, for example mentoring, research and lesson groups.
- Observation focuses on students rather than teachers. Feedback is all about how to improve student learning.
- Hong Kong has sought to address teacher resistance to classroom observation by re-establishing it as a tool for teacher development rather than punitive evaluation.

Establishing classroom observation as a common practice in schools contributes to teacher professional status. It recognises the complexity of teaching processes, and the need for teachers to continuously develop, and receive feedback to be effective in their roles.[222]

This chapter discusses the impact of classroom observation on learning and how it operates in Shanghai. It concludes with a focus on implementation of reforms in Hong Kong.

Box 11.1: How to undertake observation effectively - focus on student learning

- Student learning (not only teaching) should be the focus of classroom observation.[223] Improving student learning is the core objective, so observation should focus on the impact of teaching on student learning. Teachers can give each other immediate feedback on what is and isn't working with each student.
- Effective observation requires pre- and post-observation meetings.[224] The pre-meeting should focus on the objectives of the teacher, the class being observed, the observation itself, and how these fit in with the school's objectives. The post-observation meeting should focus on what went well and what could be improved, while encouraging self-reflection.
- In conducting the observation, teachers can work together in small teams - possibly three or four - and take turns to observe and be observed.[225]

11.1 Objectives and context

Classroom observation has been found to have a substantial impact on student learning through its fundamental role in directly improving classroom teaching. In Hattie's meta-analysis of the

[222] Zwart, *et al.* (2007)

[223] MacBeath and McGlynn (2002)
[224] Richards and Lockhart (1992)
[225] Stillwell (2009)

impacts of interventions on student learning, classroom observations that provided constructive and immediate feedback for teachers to improve their teaching had a significant impact on student learning.[226] It is a key form of professional learning that also stimulates effective professional collaboration.[227]

While initially confronting for some, teachers say that observation improves teaching and learning and collegiality in schools.[228] Teachers can test new ways of working, reveal hidden behaviours and discuss common issues and solutions. Observation helps to create a culture of sharing and exchanging ideas across and between schools.[229]

Classroom observation can act as a quality assurance mechanism, as peers monitor teaching practices and ensure consistency in the quality of teaching.[230] A collaborative approach to teaching helps teachers share responsibility for effective practice in the system.

11.2 Classroom observation in Shanghai: how it works

Highlights

- Classroom observation is done frequently in many programs - induction, mentoring and professional learning communities.
- Teachers regularly discuss mutually observed teaching in pre- and post-observation meetings.
- Teachers deliver open demonstration lessons at the District level to showcase good teaching practice to groups.
- Teachers are trained in how to undertake classroom observation effectively.

Observation is a key element of building a collaborative profession in Shanghai.

Teachers regularly observe each other's lessons, demonstrate good practice, and receive feedback on how to improve learning. It is also a key feature of induction and mentoring, where mentors and mentees observe each other's lessons and reflect on how to improve learning.

In research and lesson groups, teachers observe each other as they trial different ways of teaching. Through observation, teachers see new concepts and practices demonstrated in authentic settings. Teachers adapt to new teaching styles in a professional environment with feedback from their colleagues.

[226] Hattie (2009)
[227] Richards and Lockhart (1992)
[228] Kumrow and Dahlen (2002)
[229] Blackwell and McClean (1996), Munson (1998)
[230] Goldstein J. (2004);Goldstein (2007)

Table 7 highlights how classroom observation is integrated in professional learning programs in Huang Pu District, Shanghai.

Table 7: Classroom observation in Huang Pu District

Research Groups	
Observe peers in group	Six classes a semester
Deliver demonstration class	Once a semester (30% of group)
Lesson Groups	
Observe peers in group	Once a semester (required by some schools)
Mentoring	
Observe mentor	One class a week*
Mentee deliver demonstration class	Once a semester* at school Once a semester* at District level
Induction	
Observe mentor	Two classes a week (or more) **
District training	
Observe demonstrations	Varies

Notes: *Based on Gezhi High School in Huang Pu District, for a mentee who is a teacher with more than five years of experience.
** Based on Gezhi High School in Huang Pu District for a beginning teacher.
Source: Huang Pu District documentation, 2011

Training on effective classroom observation in Shanghai

In Huang Pu District, the Teacher Training Institute provides training on how to conduct effective classroom observation, given its importance to professional learning in Shanghai. The training is set within the context of research groups which are present in every school and involve significant amounts of observation. [231]

The training emphasises that classroom observation should focus on student learning, not just teaching. Observers should understand the effectiveness of teaching via student's in-class behaviour.

Observers are also advised to engage in the class activities, so as to maintain the accuracy of the observation. In research groups there are often several observers in the one class. They do not reveal the aim of the observation to the teacher or the students.

The group of observers should also focus on specific students, studying their learning and classroom experiences. For example if there are four observers, they may observe eight students each, depending on class size. Distribution enables the research group to discuss the progress of individual students in subsequent observations. This practice is central to improving the learning of all students. If a student starts to fall behind, multiple teachers analyse why and how it can be addressed.

After each observation, observers discuss their results in the group and give constructive views on the teacher's performance. A group leader summarises the opinions and gives feedback to teachers on how to improve their teaching methods.

[231] Huang Pu District Teacher Training Institute (2011)

The school's observation sheet requires observers to record:

- Student general information – seat number, gender, academic performance (ranked from 1 - 5). This information sets a benchmark that can be reviewed once a particular teaching style is adapted in subsequent lessons.
- Teacher's attention – in particular encouragement and recognition, criticizing and denying, non-verbal attention to students, individual instructions to students.
- Student involvement – extent of active answering, question raising, activity engaging and so on.

Following feedback, the teacher delivering the lesson is expected to modify their teaching approach and improve. Subsequent lessons can be observed by research group members to deepen their understanding of pedagogy and continuously improve teaching practices. Observation is a core element of effective continuous professional learning.

Demonstration lessons

Demonstration lessons in Shanghai involve teachers showcasing effective teaching practices to large groups of teachers. It is done at both school and District levels. Districts often select top teachers (including top beginning teachers) to demonstrate their teaching skills to others across the District.

One school principal estimated that a teacher in their school observes around ten demonstration lessons each year.[232]

Box 11.2: Open classes at Shanghai Experimental School

At Shanghai Experimental School (SES) teachers deliver open classes observed by groups of teachers. Post-observation, teachers complete an online evaluation that gives constructive feedback to the demonstration teacher.

Teachers have short notice that their lesson is to be observed, and may find out just prior to the lesson starting. This practice encourages all teachers to always prepare well for lessons.

Open classes are videotaped and the best demonstration teacher has a video developed. Teachers from other schools also come to see demonstration classes.

Case-study demonstration classes

Shanghai teachers also participate in case-study demonstration classes. Classes involve leaders putting together a case-study that is observed by the group. The case-study explores a particular issue in depth and involves a collection of materials, recordings of classes and live teaching.

[232] Grattan Institute interview at Shanghai Experimental School, (2011)

In Huang Pu District, trainers from the District Teacher Training Institute lead case-study demonstration classes. The case-study approach involves three stages:

- *First Stage*: the case-study topic is selected and the trainer develops the materials to be considered by a group of teachers. Materials may include: teaching videos, open classes and books.
- *Second Stage*: group discussion of materials and live teaching.
- *Third Stage*: class discussion of group findings. Teachers reflect on what they have learned and how to incorporate new practices into their own teaching.

Huang Pu District now considers case-study demonstration classes as one of the most beneficial forms of training in Shanghai.[233] It is considered extremely effective in developing teachers' practical teaching capabilities, including diagnosing student learning, lesson planning, critical reflection, and research-oriented teaching.

11.3 Implementation - Hong Kong's reforms of classroom observation

While Shanghai provides an outstanding example of classroom observation, other systems may be challenged in establishing this practice. Teachers in many countries can be confronted by their work being observed by other teachers.

Policy makers may find Hong Kong's recent reforms relevant as they have acted to re-establish observation as a tool for professional learning, rather than punitive evaluation.

Setting the strategic objective and identifying behavioural change

In Hong Kong, teachers have traditionally been resistant to classroom observation. A study showed a considerable percentage of teachers did not want peers in their classroom.[234] Observation was not common. When it was done, it was primarily for teacher appraisal. When teachers were asked what they would like from observation, they reported they wanted it to be used for professional learning. At that time, peer collaboration and staff development were not widespread practices. Over the past decade, Hong Kong has strived to re-establish classroom observation as a tool for professional learning.

Establishing champions and engagement stratetgy

Specific projects were established to champion support among teachers for the new approach. Academics were brought into schools to explain the research findings on classroom observation and rationale of reforms.

In 2004, an annual conference was organised to promote observation, drawing on international experts.[235] In these forums, observation was emphasised as a tool to share good practice and an opportunity to reflect and learn from others.

[233] Huang Pu District Teacher Training Institute (2011)

[234] Lam, *et al.* (2002)

[235] Grattan Institute interview at Education Commission, Hong Kong, (2011)

Whole-system implementation tools

Classroom observation was a key tool to implement Chinese reading literacy reforms in the *Learning for Life, Learning Through Life* Strategy. For example, teachers were encouraged to observe each other's classes in the implementation of Chinese Reading Literacy reforms. Observation and feedback helped teachers to see new teaching methods demonstrated in the classroom by their peers, and adapt to new teaching styles.[236]

Observation also underpinned other reforms such as promoting reading in schools and promoting school effectiveness. The success of these reforms was believed to depend on opening the classroom for other stakeholders to observe, such as parents. While observation was challenging for teachers, it helped to improve the adoption of new practices.[237]

Quality assurance (external) reviews of school effectiveness emphasised the importance of classroom observation.

Initial education re-enforced the importance of classroom observation. Courses emphasised classroom observation as a key skill for future teachers. Student teachers observed qualified teachers in the classroom and wrote up reflections for their university supervisors.[238] Reform of initial education equipped student teachers to undertake lesson observation effectively, and establish the practice as the norm for the next generation of graduating teachers.

While there has been progress in expanding the use of classroom observation, there is still some way to go. In 2007, the Advisory Committee on Teacher Education and Qualifications recommended that "*the potential of peer observation could be tapped further promote peer learning and reflective practices, taking into account teachers' readiness and setting an appropriate pace for practice"*. But there has been a significant shift in teachers' perceptions. Now, teachers feel that peer observation is a cost-effective and useful professional development opportunity.[239]

[236] Tse (2011)
[237] Centre for Advancement of Chinese Language Education, University of Hong Kong documentation (2012)
[238] Tse (2011)
[239] Advisory Committee on Teacher Education and Qualifications (2003)

Box 11.3: Cultural change in other contexts - opening classroom doors in a single year in Melbourne, Australia

Reform at Roxburgh College, a government school in Melbourne's northern suburbs, provides an excellent example of cultural change at the school level. In one year, the school culture has changed from one typified by little sharing of teaching practices to one where classroom doors are open and effective teaching is shared throughout the school.

Previously, there was little expectation that people would share teaching practice. The education narrative in the school was more focused on what was being taught rather than how it was being taught.

Over a 12-month period, the school implemented a peer appraisal program that has fundamentally altered teacher appraisal and feedback in the school. All staff are seen as learners. A leadership group committed to change was created. The group is focused predominantly on teaching and learning, and producing cultural change through peer observation and a greater connection with student learning.

Cultural change in the school started with a conversation about what happens in classrooms and how good practices should be shared. Staff were then grouped into professional learning teams in key learning areas to work on classroom practice and observe each other's classes, before reflecting on development opportunities. A subsequent cycle of peer observation gauged the improvement that had resulted. Teachers got more feedback, which illustrated the benefits of peer observation and why good teaching mattered. It also led to interventions for specific students, particularly those falling behind.

12. Teacher career structures

Highlights

- Concerns over falling teacher retention, low professional status, and poor recognition led to widespread changes.
- Reforms were introduced to increase teachers' pay, create a comprehensive system of teacher appraisal, tie it to meaningful teacher development and professional learning, and increase the status of teachers relative to other professions (both inside and outside of the education sector).
- Reforms have had a substantial positive impact. For example, teacher attrition rates, which were rising, are now consistently less than one-third of the rate in the rest of the public service.
- Teachers don't have to leave the classroom to get a promotion. Senior teaching positions have been created that recognise and reward classroom teaching.

Teacher evaluation and promotion are hot topics in many countries. Key concerns in a number of education systems include:

- Inadequate appraisals of teacher's work leading to promotion based on length of tenure rather than effectiveness.
- A lack of development opportunities for teachers and insufficient constructive feedback that should be fundamental to teachers' professional learning.
- Restricted promotion opportunities that provide little recognition for teachers - especially effective teachers later in their career – and often result in teachers being 'promoted out of the classroom'. [240]

In the 1990s and early 2000s, concerns in Singapore reflected, to at least some degree, some of these problems. In response, reform to teachers' career structure, pay (including bonus) and a system of teacher evaluation and development have been introduced. Reforms have fostered a high-performing and highly regarded teaching profession. Since the reforms, the teacher attrition rate has halved and is now one-third of the rate in the rest of the public service.

[240] OECD (2009b), OECD (2005)

12.1 Objectives and context

In 1996 the attrition rate amongst teachers was increasing in Singapore. Younger teachers were leaving the profession and a large portion of senior teachers was soon expected to retire. The assessment of teachers' performance was administered by the Singapore Public Services Commission, which also handled the careers of police, civil defence and nurses. The system was ill-suited to the teaching profession.

A series of reforms were introduced to increase teachers' pay, create a comprehensive system of teacher appraisal, tie it to meaningful teacher development and professional learning, and increase the status of teachers relative to other professions.

Following the reforms, the attrition rate due to both retirement and resignation remains well below the attrition rate for the rest of the public service in Singapore.[241]

This chapter shows how successful reform was achieved. The new career structure is described alongside discussion of reforms to the appraisal of teachers' performance with the introduction of the Enhanced Performance Management Scheme (EPMS). Links between teacher appraisal and remuneration (bonuses) are also analysed. In the final section implementation considerations are discussed, highlighting the importance of capacity building, teacher job differentiation, and the sequencing of implementation reforms.

12.2 Making it work

Highlights

Teachers in Singapore can follow different career tracks, each with their own levels of promotion:

- Senior Specialist Track – teachers with high-level specific skills and education knowledge. Positions mostly held in the Ministry of Education.
- Leadership Track – leaders are spread across the system managing departments, schools or clusters of schools.
- Teaching Track – provides promotional opportunities for teachers with excellent subject, pedagogical and assessment knowledge.
- The Enhanced Performance Management System (EPMS) for teachers is a comprehensive development-oriented system that is linked to teacher pay. It includes extensive planning of teachers' activities, frequent coaching and mentoring, reflection and feedback, and is strongly linked to professional learning.

[241] Grattan Institute interview at Ministry of Education, Singapore (2011)

12.2.1 Career tracks

Teachers and other staff in school education in Singapore can progress along three different career tracks: Teaching Track, Leadership Track, and Senior Specialist Track (See Figure 16).[242]

Educators are assessed for promotion up each track and lateral movement between tracks is possible, provided the applicant meets the necessary criteria of the new track.

Specific skills can be better targeted and developed. Effective teachers receive well-deserved recognition. But promotion does not take them out of the classroom. They do not have to enter administration to get a promotion. Effective teachers stay where they have the greatest impact: in classrooms.

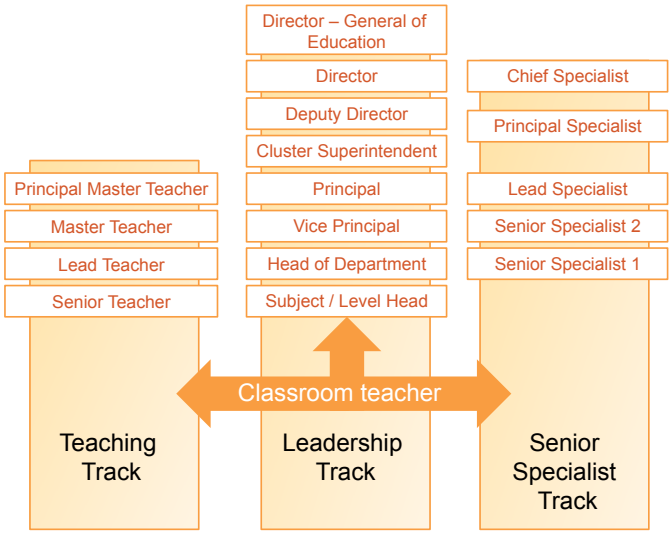
The Senior Specialist Track has created a group of educators with high-level skills in specific areas of learning and teaching (e.g. subject-specific pedagogy) supported by strong knowledge in specific areas of education. These people work within and between schools, but a large portion hold positions in the Ministry of Education. The development of the Senior Specialist track has been important for keeping Singapore a leading education system, developing cutting-edge thinking in the Ministry of Education and throughout the school education sector.

The Leadership Track has created a pool of talented leaders that work within and across schools to support, mentor and assess teachers. It enables a forward-looking school education sector by:

- Identifying and planning training and development possibilities.
- Planning career advancement opportunities (postings and assignments).
- Helping schools with succession planning. Succession planning is done systematically - managed at the school, district and system level. Future vacancies are identified at each level and young high-performers are moved accordingly. For example, a young high-performing teacher is often placed in a middle-senior management position in a school with a forecast vice-principal vacancy.

[242] OECD (2009c), Grattan Institute interview at Ministry of Education, Singapore (2011)

Figure 16: Career tracks in Singapore school education



Source: National Institute of Education, (2009), Singapore

Potential leaders are identified through the EPMS and a program that assesses teachers' *Current Estimated Potential*. This program identifies young high-performers with leadership potential. Assessments are made in consultation with senior staff and other colleagues based on observations, discussions, portfolio evidence, and teachers' contribution to the school and community. The program supports the information and data collected through the EPMS.[243]

Potential leaders are then placed in mentoring and developmental programs, and are provided with regular opportunities to interact with senior management.

Leaders undertake additional training such as the National Institute of Education's (NIE) *Management and Learning in Schools* course. Vice principals with the potential to become school principals undergo the *Leaders in Education Program* at NIE. Here, they can participate in the *Create Action Group* where they are attached to a school for a minimum of two months and must develop a framework for a future developmental transformation of the school.[244]

Leaders often have stints in the Ministry for exposure to not only the workings of the Ministry but effective senior managers.

High performing teachers enter school principal education courses often well before they reach the position of school principal. After successfully completing the course they are often made vice-principals in schools where the school principal is expected to move on in the next few years.

[243] Grattan Institute interview at Ministry of Education, Singapore (2011)
[244] Ibid.

Advancement within and between tracks is determined by multiple factors including the teacher's individual performance and potential (as measured with the EPMS) and by the schools' needs. Advancement reflects the strong belief that teaches can improve the learning of *all* students, other teachers, and the education sector more broadly.

Promotion steps in the Teacher Track include:[245]

- Classroom Teacher: the initial rank for all teachers as they are deployed to schools after graduation.
- Senior Teacher: requires teachers to have at least 5 years high quality teaching as a classroom teacher and to have consistenly demonstrated outstanding performance in the three years prior to application as well as be in the top cohort of teachers in the school. Classroom teachers can then be nominated by their school principal to undertake a rigorous selection process. The nominated teacher must pass an accreditation process including an interview and selection panel. A Senior Teacher has developed good pedagogical practices, and develops other teachers in their school with expert advice and assistance.
- Lead Teacher: manages Senior Teachers and partners school leaders to build professional capacity within the school in areas such as subject content, pedagogy and assessment. Lead Teachers also play a key role in developing Professional Learning Communities (see Chapter 10) in their schools, and through sharing their subject expertise with teachers in their school cluster.

  The Lead Teacher ranking corresponds to that of Head of Department in the Leadership Track, in terms of pay and standing.
- Master Teacher: guide and advise teachers within their school cluster to help introduce new methodologies and teaching practices. They report to the superintendent of their school cluster who, in consultation with other schools in the cluster, decides to which schools Master teachers should be deployed. To achieve the Master Teacher status, teachers must present a portfolio documenting achievements in line with Master Teacher accreditation criteria.

  In 2006, the role of Master Teacher Level 2 was created with a pay and standing in the hierarchy equivalent to a school vice-principal.
- Principal Master Teacher: as the chief pedagogical experts for their subjects at the national level, Principal Master Teachers drive teaching excellence across the education system. As 'teachers of teachers', Master Teachers play a valuable role in curricular innovation, championing their subject discipline and driving new pedagogies to continually improve teaching practices in schools.

  While primarily attached to the headquarters of the Ministry of Education, Principal Master Teachers and Master Teachers will teach master-classes in schools, lead the professional

[245] OECD (2009c), Grattan Institute interview at Ministry of Education, Singapore (2011)

learning of teachers, drive curricular innovation in schools, and engage in pedagogical research and innovation.

Box 12.1: Principal Master Teachers in Singapore

The role of Principal Master Teacher was introduced in 2010 with a pay and standing in the hierarchy equivalent to a school principal. Principal Master Teachers play a key role in the development of the profession and help build productive relationships between schools and the Ministry. They are also important for effective implementation of reforms, particularly those aimed at improving pedagogy and teaching practices.

12.2.2 Promotions within career tracks: the Enhanced Performance Management Scheme (EPMS)

Since 2005, the EPMS has been used for all educators across the three career tracks. It is a comprehensive system of teacher appraisal and feedback, developed by the consulting company *Hay Group* and the Ministry of Education.[246]

The EPMS is developmental, in that:

- It is not a one-off exercise each year; rather it provides ongoing constructive feedback for teachers.
- It requires considerable self-evaluation and reflection on how each teacher can improve his or her performance and engage in productive professional learning.
- A development plan is established at the start of each year, that requires on-going performance monitoring and constructive feedback.
- Extensive documentation of teachers' career progression and development ties long-term development needs to career aspirations and planning.

These developmental processes complement the mid- and end-of-year summative reviews of progress towards stated goals, and data on performance benchmarks.

Focus of teacher appraisal

The *Work Review Form* supplied by the Ministry of Education comprises five sections: Key Results Areas; teaching competencies; training and development plan; innovation and improvements; and, reviews and comments on performance and competencies.[247]

The teacher and their manager will identify and set targets for the year, and milestones for mid- and end-of-year reviews. These *Key Result Areas* reflect the teacher's job description, and also school and system-wide education objectives. Targets can focus on:

- Holistic development of students through quality learning, pastoral care and well-being, and co-curricular activities.
- Contribution to their school.

[246] Grattan Institute interview at Ministry of Education, Singapore (2011)

[247] Ministry of Education, Singapore documentation

- Collaboration with parents.
- Professional development.
- Other targets.

Teaching competencies focus on the core competency of nurturing the whole child.[248] Four complementary competencies are: cultivating knowledge; winning hearts and minds; working with others; and knowing self and others. The initial competency is not included in the end-of-year summative assessment of teachers' performance but is considered fundamental to effective professional learning and personal growth.

These competencies are aligned to teachers' responsibilities that, in turn, reflect their Key Result Areas. Importantly, competentcies also reflect school and system-wide objectives to ensure that all educators are working towards the same goals.

Nurturing the whole child – teachers have many ways of nurturing children's development in a holistic sense. Offering advice and feedback to students and talking to them about their values, lifting their self-confidence and overall development. This competency is expected of all teachers and for more experienced teachers, includes their role in school-wide (and in some cases system-wide) initiatives aimed at nurturing the whole child.

Cultivating knowledge – is a core function of teaching and includes:

- Subject-content knowledge that encourages teachers to show an active interest in the subject area. Maintaining an awareness of subject-specific educational trends and developments and then utilising them in their teaching. In addition, experienced teachers are expected to be active in expanding content knowledge in their subject area.
- Analytical thinking that requires teachers to show abilities to think logically, break down problems and tasks and identify relationships (and separate correlation from causality) to improve their teaching and address classroom issues. To meet individual students' learning needs requires teachers to adapt their teaching to each students' learning path at each level of subject-content mastery.
- Initiative shown by teachers that highlights abilities to identify and respond to the future needs, issues and opportunities of students. Teachers should not only respond to current situations but act decisively to ensure that problems are addressed before they fully develop and opportunities for improvement are harnessed.
- Creative teaching that requires teachers to use innovative approaches and techniques to enhance learning and teaching. Creative teaching needs to be suited to students' individual learning needs, requiring teachers to identify these needs and employ innovative teaching approaches to best meet these needs. Experienced teachers are required to teach a range of concepts simultaneously, integrating them in innovative ways both inside and outside the classroom.

[248] National Institute of Education (2009) and Grattan Institute interview at Ministry of Education, Singapore (2011)

Winning hearts and minds – teachers are required to understand their school, its strengths and limitations, and its role in the broader education context. They must have the drive and capability to help others realise their full potential, with stronger requirements for individualised feedback and support for senior teachers.

Working with others – incorporates both working with parents and other educators. Teachers are required to work collaboratively with parents, helping them educate and develop their child. Working with other educators, often in teams, is an important part of teachers' work and reflects the collaborative and developmental approach of Singapore education. Teachers are required to share with and help others to develop effective teaching and successful schools. Teachers must show the willingness to provide constructive feedback for others and be willing to receive it.

To excel in these competencies places significant demands on teachers; they must be high-performers, continually developing effective teaching practices. It is a belief held in common with the other high-performing systems discussed in this report: teaching is a complex profession requiring highly intelligent and gifted professionals that require continual professional learning. By focusing on the learning needs of the student and recognising the complexity of their learning processes, the professional requirements of the teaching profession become obvious.

Box 12.2: A disconnect between policy and the classroom - poor recognition of quality and innovation

On average across TALIS 2008 countries, just under three-quarters of teachers reported that they would receive no recognition if they improved the quality of their teaching or were more innovative in their classroom teaching.[249]

Methods of teacher appraisal

EPMS involves developing a joint understanding between supervisors and teachers on the goals that need to be attained. Supervisors are usually the direct senior of the teacher (for example, a head of department or vice-principal). For the end-of-year summative review, a senior counter-signing officer finalises the evaluation.[250]

Using the *Work Review Form*, assessment involves three phases during the year: planning; coaching; and, evaluation.[251]

1. Planning Phase – At the start of the school year, the teacher will, with their supervisor, create their training and development planning so it is aligned to Ministry, school and their departmental work-plans to set their targets in Key Result Areas.

2. Coaching Phase – Coaching is continuous throughout the year and involves informal guidance and coaching with considerable feedback. The formal formative mid-year review

[249] OECD (2009b)
[250] Grattan Institute interview at Ministry of Education, Singapore (2011)
[251] Ministry of Education, Singapore documentation

focuses on helping the teacher to improve their competencies and progress towards their goals.

3. Evaluation Phase – At the end of the year, the supervisor, teacher, and a counter-signing officer conduct and provide input into an appraisal interview. The teacher demonstrates, through oral, written, and sometimes video sources, the extent to which he or she has attained the competencies necessary to meet his or her set targets in Key Result Areas. The rating uses a four-point scale "Not observed", "Developing", "Competent" and "Exceeding". The counter-signing officer also provides comments and helps ensure impartiality.

Box 12.3: Teacher sabbaticals in Singapore

The development of teachers in Singapore recognises the research requirements of teachers. Teachers must improve their teaching not only by keeping abreast of the latest developments, but through their own analysis and school-based research.

To foster these skills, teachers are required to have a broad array of experiences in different settings. A sabbatical scheme, available after 12 years of service, offers a 2.5 month sabbatical on full pay (equivalent to one school term). Sabbaticals can include research and further education, teaching in a different school setting, and participation in a 'Teachers' Work Attachment' program where teachers join organisations outside of the education sector.

Developmental feedback and guidance based on end-of-year appraisal illustrates subsequent steps in each teacher's professional learning. For each teacher this feedback includes a detailed description of his or her competencies and suggestions for improvement.

Box 12.4: A disconnect between policy and the classroom - poor teacher development planning

On average across TALIS 2008 countries, only 27% of teachers reported that the appraisal of their work and the feedback they received led to moderate or large change in their opportunities for professional development. In addition, 40% of teachers said that in their school development or training plans were not used to improve the work of teachers.[252]

Performance-based compensation

Performance-based compensation was part of a suite of reforms to improve the status of the teaching profession. It targeted retention and the poorer salary levels of previous decades, while rewarding effective teaching.

How does it work?

All teachers have their year-end reviews considered by a school committee – including all heads of departments in schools, vice-principals and the school principal – to determine staff bonuses. The cluster superintendent moderates the ranking session. They consider each teacher's year-end review, and rank each teacher on a scale between grades between A and E. A bonus is awarded to teachers ranked A-C. Bonuses are awarded in March after the end of year review.

[252] OECD (2009b)

There are four basic steps that are taken in assigning grades and rewarding bonuses to teachers:

1. Teachers' competencies are mapped to illustrate the expected skills and knowledge of each teacher at each stage of their career.

2. The end-of-year summative review is linked to performance-based compensation. Each teacher, leader and specialist is given a grade (from A-E) after their end-of-year review. The A-E grading is made through a ranking in each school and then in each school cluster that is loosely based on a normal distribution. Five to ten per cent of teachers receive an A rating. Less than five per cent receive a D or E rating.

   The ranking on a normal distribution forces teachers and other staff to be ranked across different grades. The exceptions to this forced ranking are the lowest grades of D and E. Schools are not forced to give teachers these lowest rankings as these grades can have negative consequences for teachers and are only awarded as a reflection of absolute rather than relative performance.

3. Bonuses are paid to most teachers. The pay-out amounts differ for each performance grade, but the precise amount of the bonus varies yearly. No bonus is paid to teachers who received a D or E rating. The precise amount of the bonus depends on the funds available to the Ministry, which varies with the economic cycle. Given the available funds, the Ministry sets the percentage of teachers who can receive each rating. Again, the exceptions are the D and E ratings for teachers performing below minimum standards.

Addressing under-performance.

Those teachers who receive an E rating are considered to be formally under-performing. They are placed on a form of probation with another review scheduled in six to nine months. If improvements are not identified in the second review, then it is possible their employment will be terminated.

12.3 Implementation

Highlights

Key implementation steps included:

- Identifying and clearly articulating the need for reform.
- Extensive dialogue and engagement throughout the reform process, from initial planning to on-going evaluation.
- Sequencing of implementation steps (for example, bonus payments were delayed until well-after the performance management system was up and running.
- Capacity building within schools was comprehensive and sustained. To this day, senior teachers in schools are given training in effective performance management.
- Continual evaluation and development of reforms, responding to feedback from teachers, schools and other stakeholders.

Given the potentially sensitive nature of reforms to the career structure of teachers, which often includes changes to teacher evaluation and the introduction of bonus payments, it is important to consider the implementation of the reforms.

Sequencing of implementation steps

In the late 1990s, the Ministry of Education was faced with rising attrition rates from school education and a perceived fall in the status of the teaching profession. Three problems were identified that needed to be addressed: poor remuneration and status of school principals, poor promotional prospects for teachers, and relatively poor terms of employment for new teachers.[253]

In response, the Ministry engaged the *Hay Group* in 2000 to undertake a fundamental review and restructuring of the pay and career structure of teachers.

Hay Group worked with the Ministry to design and develop a new career structure. This work involved extensive dialogue with the teaching profession. Over 3,000 teachers participated in the process and provided feedback and comments through focus group discussions, surveys, and committees.[254]

Feedback fed into the design of the new career structure that was then followed by a large engagement process that focused initially on school principals and lead teachers. This engagement process included one to two days of discussions with middle-management from schools in each cluster. Engagement was an important component of a three year roll-out after the design of the new career structure.

School leaders were assessed and put through the EPMS before teachers were included. This sequencing not only created further opportunities to hone the new system, but illustrated the effectiveness of the system and its developmental nature in schools. In addition, it sent a clear message to teachers that the EPMS was not a top-down system that didn't include senior management.

[253] Grattan Institute interview at Ministry of Education, Singapore (2011)
[254] Ibid

Bonuses were not awarded until after the system of teacher evaluation was up and running.[255] The EPMS was rolled out between 2002-2005. Bonuses for teachers did not begin to be awarded until 2007. The delay was part of the planned sequencing of implementation interventions that recognised the need to allow stakeholders time to reflect and respond to the new reforms. It was an important feature of a successful implementation process that was developed by both *Hay Group* and the Ministry of Education.

Capacity building

Education and training have been important for effective implementation of the new system. Training has made people feel more comfortable with the system (which is an important objective on its own), and also emphasised the importance of effective mangers in developing teachers and other staff.

The engagement and education and training process has continued given the importance of the system in teachers' careers. New teachers attend EPMS workshops to fully understand their roles and responsibilities, and the career structure they are entering. In addition, the Ministry of Education has introduced a three day school-based EPMS training program for newly appointed middle managers.

Job differentiation

Importantly, education and training continues to occur alongside changes to job descriptions. Singapore has long recognised the importance of teachers in educating children, but now it has formalised the role of educating and developing other teachers. As teachers achieve greater levels of seniority, their responsibilities for providing feedback and developing the skills and effectiveness of other teachers increase.

Box 12.5: An implementation timeline

1997: Education strategy "Thinking Schools, Learning Nation" announced.

1997: Ministry of Education adds 3 middle-management roles between classroom teachers and heads-of-department (Level Heads, Subject Heads, Senior Teachers).

2000: Ministry of Education engages *Hay Group* to review pay and career structure.

2001: April- Ministry of Education announces:

- New career structure – new career tracks and renewed emphasis on professional development and career planning.
- New system of teacher evaluation (EPMS).
- New system of performance bonuses.

2002-2005: New career structure and EPMS rolled out.

2006: Ministry of Education introduces a new Master Teacher role equivalent to a Vice-Principal.

2008: Ministry of Education introduces a new Chief Specialist role in Senior Specialist Track.

2010: Ministry of Education introduces a new Lead Teacher and Principal Master Teacher to Teaching Track.

[255] Grattan Institute interview at Ministry of Education, Singapore (2011)

13. Appendix A: Participants at Grattan Institute's Roundtable, 2011

Learning from the Best: A Grattan Institute Roundtable on High-Performing Systems in East Asia, 27-28 September 2011

Chairs

Dr Ben Jensen, Program Director - School Education, Grattan Institute

Mr Tony Mackay, Asia Education Foundation

International participants

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 (KEDI), Republic of Korea

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

Dr Zhang Minxuan, President, Shanghai Normal University, China

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

Australian and New Zealand participants

The Hon. Julia Gillard MP, Prime Minister of Australia

The Hon. Peter Garrett AM, MP, Federal Minister for School Education, Early Childhood and Youth.

Mr Keith Bartley, Chief Executive, Department of Education and Children's Services, South Australia

Ms Sue Christophers, General Manager- International Education Division, Department of Education and Early Childhood Development, Victoria

Mr Nicholas Conigrave, Associate Director, Hay Group

Mr Bill Daniels, Executive Director, Independent School Council of Australia

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

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

Dr Peter Hill, Chief Executive Officer, Australian Curriculum, Assessment and Reporting Authority

Ms Amélie Hunter, Research Associate, Grattan Institute

Ms Diane Joseph, Deputy Chief Executive, Department of Education and Training, ACT

Ms Kathe Kirby, Executive Director, Asia Education Foundation

Ms Ellen Koshland, Centre for Public Education

Ms Leslie Loble, Chief Executive of the NSW Office of Education, Department of Education and Communities

Ms Susan Mann, Chief Executive Officer, Education Services Australia

Professor Geoff Masters, Chief Executive Officer, Australian Council for Education Research

Ms Jenny McGregor, CEO of Asialink and Executive Director of Asia Education Foundation

Mr Rob McIntosh, Deputy Secretary – Tertiary, International and System Performance, Ministry of Education, New Zealand

Ms Lyn McKenzie, Deputy Director-General, Department of Education and Training, Queensland

Ms Zoe McKenzie, Senior Adviser, Office of the Hon. Ted Baillieu, Premier of Victoria

Ms Maxine McKew, Social Ventures Australia

Ms Jan Owen, Centre for Public Education

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

Ms Kym Peake, Deputy Secretary, Skills Victoria

Mr Colin Pettit, Secretary, Department of Education, Tasmania

Ms Julie Sonnemann, Research Associate, Grattan Institute

Mr Donald Speagle, Deputy Secretary, Department of Premier and Cabinet-Victoria

Mr Michael Traill, Chief Executive, Social Ventures Australia

Ms Catherine Wall, Deputy Secretary – Schools, Department of Education, Employment and Workplace relations

Mr Chris Wardlaw, Deputy Secretary, Department of Education and Early Childhood Development, Victoria

14. Appendix B: Sample PISA questions

Sample science question

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 Zedland, 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.

Source: OECD (2009) PISA Take the Test: Sample Questions from the OECD's PISA Assessments

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