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SINGAPORE

PISA
Lessons For and From Singapore

CJ Koh Professorial Lecture Series No. 2
Series Editor: Associate Professor Ee Ling Low







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CJ Koh Professorial Lecture Series No. 2
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FOREWORD

It gives me great joy and pleasure to present this second issue of the *CJ Koh Professorial Lecture Series – PISA: Lessons For and From Singapore*. This is a consolidated report of a symposium, seminar and public lecture presented by Professor Andreas Schleicher held from 1 to 3 November 2011 in conjunction with his appointment as CJ Koh Professor.

The CJ Koh Professorship appointments have been made possible through a donation of S$1.5 million to the Nanyang Technological University Endowment Fund by Mr Tiong Tat Ong, estate executor of the late lawyer Mr Choon Joo Koh (CJ Koh). The endowment serves the programme of the CJ Koh Professorship in Education. An additional sum of S$500,000 was donated to the endowment fund for the award of the Pradap Kow (Mrs CJ Koh) Scholarship in Higher Degrees in Education. Since its inception and the appointment of the first CJ Koh Professor in 2006, the Professorship has allowed for the appointment of world-renowned Professors of Education. The ultimate goal of the Professorship is to enable a healthy exchange of ideas between these professors and our local scholars and, in so doing, to sow the seeds for joint research, publication, collaboration and partnership opportunities.

The purpose of this series is to ensure that the discussions arising from these visits reach out to the National Institute of Education (NIE), the Ministry of Education, Singapore (MOE) and the wider community, to add to our understanding of both the local and global educational landscape, to provide ideas for further research, and to inform future educational policy and practice.

FOREWORD

Preparations for Professor Schleicher's CJ Koh visit date back to a meeting at the International Summit on the Teaching Profession held in New York in March 2011. Following up on a conversation during tea break to organise a symposium to be held in conjunction with the CJ Koh Professorship appointment in November 2011, plans were made for the lectures to emphasise what Singapore can glean from a comparison of performance in the Organisation for European Economic Co-operation's (OECD) Programme for International Student Assessment (PISA) across countries.

As Special Advisor to the Secretary-General on Education Policy and Head of the Indicators and Analysis Division at the OECD, Professor Schleicher drew out implications from the 2009 PISA results that were particularly insightful and poignant. He delivered three lectures during his visit: a closed-door symposium delivered to a highly specialised group of educational professionals across the spectrum of Singapore's education system; a seminar delivered to all NIE faculty, research and administrative staff; and a public lecture attended mainly by educators from different sectors of the education system.

The symposium entitled "Lessons from PISA about Some of the World's Best-performing Education Systems" was held on 1 November 2011 at NIE. It focused on the emergence of PISA as a paramount reference point for judging educational outcomes. The symposium examined the education reform trajectories of some of the high-performing and rapidly improving education systems, looking at a range of aspects such as how they set and monitor their goals, generate and manage their human and financial resources, and design their accountability systems.

The seminar on 2 November 2011 generated much interest. Entitled "Trends and Practice of Teacher Policies", this seminar showcased how many countries are striving to raise the quality of the teaching profession, with the status, professional autonomy and high-quality education that go with professional work, with effective systems of teacher evaluation and with differentiated career paths for teachers.

The public lecture, "Skills for the 21st Century: Translating Better Skills into Better Economic and Social Outcomes", was held on 3 November 2011. The lecture accentuated the importance of highly skilled workers as the cornerstone for sustainable economic growth in countries and the need for successful economies to ensure a good skills match to drive strong, sustainable and balanced economic outcomes.

In this issue, we have also included three thoughtful insights by Professor Schleicher, Professor Sing Kong Lee and Professor Wing On Lee. Entitled "Singapore: Five days in Thinking Schools and a Learning Nation", Professor Schleicher recounted his five-day visit to Singapore. First published on the OECD blog, he penned the afterthoughts of his visit which he summarised in one sentence:

> This is a story about political coherence and leadership as well as alignment between policy and practice; about setting ambitious standards in everything you do; about focusing on building teacher and leadership capacity to deliver vision and strategy at the school level; and about a culture of continuous improvement and future orientation that benchmarks educational practices against the best in the world.

Another highlight of this issue is the prologue by Professor Wing On Lee in which he expounds on the international trends revolving around "PISA fever", including impacts and implications of PISA's findings on education practices and policies around the world, which sets the stage for the rest of the report. Professor Sing Kong Lee has added the finishing touch to this publication with his insights on what lies at the heart of Singapore's educational success and what Singapore can do to continually stay ahead of the educational curve.

FOREWORD

Finally, a huge debt of appreciation goes to all who have made this report possible. To Professor Andreas Schleicher, who despite his busy schedule still carved out time for this visit, for the many nuggets of wisdom he has shared us.

To NIE Director Professor Sing Kong Lee and Dean of Education Research Professor Wing On Lee, thank you for being totally supportive of the CJ Koh Lecture Series, for releasing the funds from the sponsorship to make both the lectures and the publication of the report a reality, and for penning the epilogue and prologue respectively.

Finally, this report would not have been possible without the excellent secretariat team which supported the writing from the very rough first drafts to the final product you see today, Research Assistants and Associates (in alphabetical order) Mr Chenri Hui, Mrs Audrey Lam, Ms Ava Patricia Cabiguin Avila and Ms Jocelyn Sara Tan; and also to Executives from the Office of Education Research (Publishing Team) Ms Ai-Leen Lin and Mr Jarrod Tam.

To all of them I would like to express my most sincere acknowledgement and thanks. It leaves me now to wish you all an enjoyable read as you scour through the pages of this report.

Associate Professor Ee Ling Low
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Series Editor, *CJ Koh Professorial Lecture Series*
April 2012
Singapore

PROLOGUE
LEARNING FROM SUCCESS*

PROFESSOR WING ON LEE AND **PROFESSOR SING KONG LEE**
DEAN OF EDUCATION RESEARCH, NIE, SINGAPORE DIRECTOR, NIE, SINGAPORE

Transformed by the emergence of university ranking exercises such as the QS University World University Rankings, Shanghai Jiaotong Academic Ranking of World Universities, Times Higher Education's World University Ranking, and Ranking Web of World Universities (Webometrics), the higher education sector is contesting among themselves to stand out and catch up in these prestigious rankings.

Internationally benchmarked tests of student achievement, such as the OECD's Programme for International Student Assessment (PISA), and the Trends in International Mathematics and Science Study (TIMSS) have drawn worldwide scrutiny warranted by the diverse performances across countries among students of the same age cohorts in schools. Once again, education policy issues pertaining as equity, quality, effectiveness and efficiency were raised in the light of the varied educational performance and/or learning outcomes across participating countries.

Singapore, Hong Kong SAR, South Korea, Japan, Chinese Taipei and recently Shanghai were thrust into the international spotlight as many these East Asian jurisdictions consistently rank top of the league in these studies. Educators all over the world converge to their schools to learn how they build education systems that are highly efficient, equitable, effective, participative and superior in performance. The triumph of these East Asian jurisdictions has forged education miracles in the 21st century which may be likened to the economic miracles that Asia's Four Little Tigers (Japan, Singapore, Hong Kong and South Korea) created back in the 1980s.

But in addition to these Asian miracles, Finland has also created the "Finnish miracle", being ranked top consistently in many of these studies, including the most recently released International Association for the Evaluation of Educational Achievement (IEA) International Civic and Citizenship Education Study (ICCS) report (Schultz, Ainley, Fraillon, Herr, & Losito, 2010). It is therefore intriguing to investigate if these Top Performing Education Systems (henceforth TPES) in Asia are more Finn-like or Finland is more Asian. Another factor common to these TPES, is the value that the society hold of education. The consistent success of this small number of jurisdictions has also raised an intriguing question, as they are relatively smaller states in contrast to the many larger participating countries which have tended to be ranked middle to lower in the international benchmarked tests. This leads to the conclusion that if "small is indeed beautiful" and if the size of the countries is a determining factor then that would impact the effectiveness of governing the average success of students nationwide.

**An extended version of this article first appeared in the IALEI E-Newsletter, Vol. 2*

PROLOGUE
LEARNING FROM SUCCESS*

PROFESSOR WING ON LEE AND PROFESSOR SING KONG LEE
DEAN OF EDUCATION RESEARCH, NIE, SINGAPORE DIRECTOR, NIE, SINGAPORE

The "PISA fever" went viral across nations as education ministers, high-level policymakers, researchers, administrators and educators investigated how these TPES continually better themselves to equip their students with 21st century skills. International meetings were staged and subsequent publications were penned to appraise what and how TPES have done to raise the bar. The schools visits, meetings, summits, roundtables, reports and publications also highlighted the immerse importance of providing high quality education for all, coherence throughout the systems (policies and work systems) and a quality teaching workforce.

The prestige of the teaching profession has been elevated and the Asia Society organised the Improving Teacher Quality around the World: The International Summit on the Teaching Profession in New York in March 2011 to engage countries in a discussion about outstanding practices for recruiting, preparing, developing, supporting, retaining, evaluating, and compensating world-class teachers. Three months later, the 14th OECD Japan Seminar: Strong Performers, Successful Reformers in Education was held in Tokyo, where high-level policymakers, administrators, researchers and educators gathered to uncover the design and implementation of educational reform and programmes that underpinned success in countries that have shown consistently strong student learning performance or that have seen rapid improvement in recent years. Down Under, the Grattan Institute convened a roundtable that brought together educators from Australia and four of the world's top five school systems: Shanghai, Hong Kong, Singapore, and Korea to analyse the success of the four outstanding systems and the lessons it provided for Australia and other countries.

These meetings subsequently led to the release of reports and publications including the *Improving Teacher Quality around the World: The International Summit on the Teaching Profession* by Asia Society, *Surpassing Shanghai: An Agenda for American Education Built on the World's Leading Systems* by Marc Tucker; and *Catching Up: Learning from the Best School Systems in East Asia* by Grattan Institute. The interest in learning from the TPES has led to the publication of two McKinsey reports in 2007 and 2010 respectively. The first McKinsey report (Barber & Mourshed, 2007) acknowledges of the quality of teachers and teacher education as key contributors to the quality of the of education system – with the clarion call that the performance of an education system can only be as high as the quality of its teachers. This implies that education policymakers need to converge their policies to attract the finest students of each cohort into the teaching profession. There appears to be some truth as the successful jurisdictions do attract top performers into teacher education, for example the top 5%–10% in Finland and South Korea, and the top 10%–30% in Singapore and Hong Kong SAR.

While the first McKinsey report attempts to tease out lessons from the top 10 education systems, the ambition of the second McKinsey report (Mourshed, Chijioke, & Barber, 2010) was to further confine itself to the lessons from the top five education systems, and it adopted James Collins' concept of "good to great" into a systemic analysis, also adding a new category called "great to excellent". As mentioned, the second report also began to look at the leadership of the education system as a possible factor, in terms of the leaders staying in office for at least seven years. This implies a need for determination, commitment and persistence in implementing education reform agendas in the respective jurisdictions.

In addition to the McKinsey reports, the OECD (2010) published a report entitled *Strong Performers and Successful Performers in Education: Lessons from PISA for the United States* following the publication of the PISA results. Obviously, this was a study commissioned by the USA. The Foreword of the report particularly noted Obama's endeavour in launching one of the world's most ambitious education reform agendas, namely the

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"Race to the Top" initiative. For the USA, the middle ranking obtained in the PISA 2010 has created today's "Sputnik" crisis, another call for emergency since the last emergency call by *A Nation at Risk* in 1983, raising a question whether the USA is "still a nation at risk".

The publications provided constructive suggestions how legacy systems could improve by abandoning policies and practices that have shown insignificant progress and investing their resources. The publications also raised evidence to justify the minimal influence of cultural differences, Confucian values, rote learning, size (of system and classes) and expenditure on high achievement and equity through a closer examination and comparison of these systems. These findings have warrant that all education systems are capable of performing and levelling up, and not just systems that have inherited the "right" conditions.

Today, we are living in a globalised world with an active turnover of information about education performance, which is available for immediate analysis with transparency. We are also living in a world in which multiple agencies can participate in defining educational achievements, such as international research organisations, consultancy companies and non-governmental organisations. We are thus living in a world that is keen to contemplate what counts as success and define success factors, from diverse perspectives. Our joint efforts in offering our lens to look at successful experiences will be essential and helpful for the global community to identify success factors that could be useful for the education development agenda in their nations.

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ABOUT THE CJ KOH PROFESSOR ANDREAS SCHLEICHER

Professor Andreas Schleicher is Special Advisor on Education Policy Advisor to the Secretary-General of the OECD. As Division Head of the Indicators and Analysis Division of the OECD Directorate since 2002, he is also responsible for the development and analysis of benchmarks on the performance of education systems and the impact of knowledge and skills on economic and social outcomes, including the Programme for International Student Assessment (PISA), the Programme for the International Assessment of Adult Competencies (PIAAC), the Teaching and Learning International Survey (TALIS) and the Indicators of Education Systems Programme (INES).

Before joining the OECD in 1994, Professor Schleicher was Director for Analysis at the International Association for Educational Achievement (IEA). He studied Physics in Germany and received a degree in Mathematics and Statistics in Australia. He is the recipient of numerous honours and awards, including the Theodor Heuss Prize, awarded in the name of the first president of the Federal Republic of Germany for “exemplary democratic engagement”. He holds an honorary professorship at the University of Heidelberg.

LESSONS FROM PISA

ABOUT SOME OF THE WORLD'S BEST-PERFORMING EDUCATION SYSTEMS

PROFESSOR ANDREAS SCHLEICHER

1 NOVEMBER 2011, SYMPOSIUM, NIE, SINGAPORE

This closed-door symposium was delivered to a highly specialised group of educational professionals across the spectrum of Singapore's education system, including Ministry of Education officials at the Director level and appointment holders (academic and corporate) from the National Institute of Education, Singapore. The session was very well attended and also involved a highly interactive dialogue session that followed the main lecture, which is summarised here.

Abstract

In a global economy, where the benchmark for educational success is no longer improvement by national standards alone but the best-performing education systems internationally, OECD's Programme for International Student Assessment (PISA) has become an important reference point for judging educational outcomes. Whether in Asia, Europe or North America, some countries display strong overall performance in PISA and, equally important, show that poor performance in school does not automatically follow from a disadvantaged socio-economic background. Furthermore, some countries show that success can become a consistent and predictable educational outcome, with very little performance variation across schools. Perhaps most intriguingly, some countries demonstrate that rapid progress can be achieved within less than a decade, thus dispelling the myth that success in education is all about culture and context. The symposium examines the education reform trajectories of some of these high-performing and rapidly improving education systems looking at a range of aspects including how they set and monitor their goals, generate and manage their human and financial resources, and design their accountability systems.

Introduction – Design, Alignment and Implementation of Policies

The key to understanding the nature of the policy and implementation challenges of high-performing education systems is to recognise the distinct yet interdependent issues in the design, alignment, and implementation of

new and existing initiatives. The design of the policies has to be holistic and comprehensive, taking into account the impact and outcomes of policies for stakeholders across the educational spectrum both in the short and long term. It is also essential to align existing resources (including human capital) and processes required to build a better system.

Additionally, compensation and working conditions must be aligned, otherwise the supply of new teachers will experience a slowdown. However, increasing the pay and enhancing working conditions alone will not automatically translate into improvements in teacher quality; standards must also be raised in tandem with these compensatory benefits. Teacher evaluation systems have limited power when tied only to compensation. Such practice has failed to reap the intrinsic value of professional development and career advancement. Transferring autonomy to teachers can be counterproductive if the quality and education of the teachers are inadequate to build their capacity to shoulder such heavy responsibilities. These are just some of the many intertwined issues that must be worked out for policies to be implemented successfully.

Ultimately, education is about improving student learning outcomes, and these are the result of what transpires in the classroom. Instructional policies and practices, in turn, are shaped by people – teachers, principals and families. The quality of an education system cannot exceed the quality of its teachers. However, the quality of teachers cannot exceed the quality of the work organisation, the quality of teacher selection and education, teacher career development and evaluation, and the processes that are shaped by policy tools. Therefore, success depends on the design, alignment, and implementation of effective policies. Figure 1 illustrates the interlinkage between the different elements of the educational ecosystem.

The following are some of the factors defining some of the world's high-performing educational systems.

Commitment to Universal Achievement

There is no question that most nations declare education to be a key enabler for social and economic progress. In our world of limited resources, the OECD Programme for International Student Assessment (PISA) results reveal that political and social leaders in high-performing systems persuade citizens to make choices that place a premium on education above all other pursuits and goals in life.

However, placing a high value on education is only part of the equation. The belief in the possibility that all children can achieve success also plays a significant role. In most high-performing countries, it is the responsibility of schools and teachers to engage with the diversity of student interests, capacities, and socio-economic contexts. Parents, teachers, and the public at large embrace the shared belief that all students are capable of achieving high standards and that they need to do so. They serve as exemplars of how public policies can support the achievement of universal high standards.

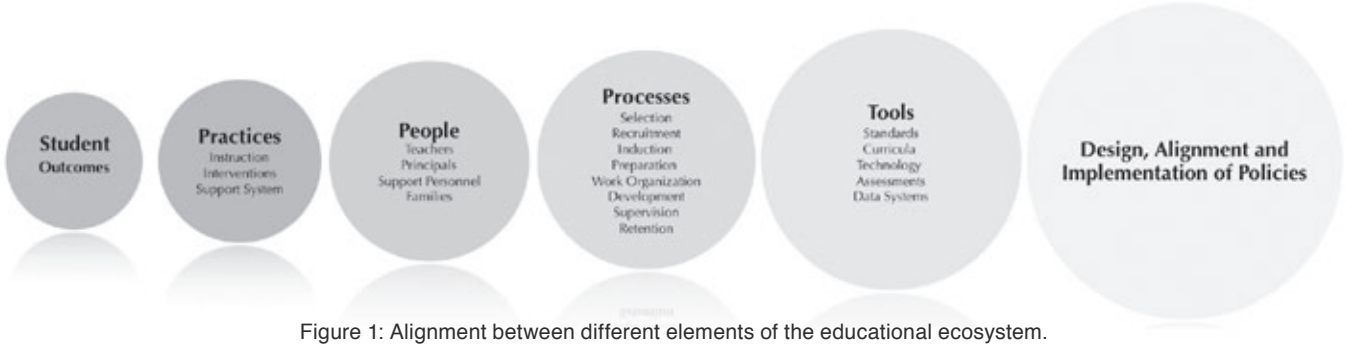

Figure 1: Alignment between different elements of the educational ecosystem.

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1 NOVEMBER 2011, SYMPOSIUM, NIE, SINGAPORE

Goals, Gateways, and Instructional Systems

High-performing education systems share clear and ambitious standards across the entire educational spectrum. Everyone knows what is required to obtain a qualification, both in terms of the content studied and the level of performance needed to attain it. Assessments of student performance have become common in many OECD countries and the results have been widely reported for the purpose of public and more specialised debate. However, the rationale for assessments and the nature of the items used vary greatly within and across countries.

In the PISA 2009 test, school principals were asked to report on the types and frequency of assessment used: standardised tests, teacher-developed tests, teachers' judgmental ratings, student portfolios, and student assignments. Seventy-six percent of students in OECD countries are enrolled in schools that use standardised tests. Standardised tests are relatively uncommon in Slovenia, Belgium, Spain, Austria and Germany, where less than half of the 15-year-olds attend schools that assess students through these kinds of tests. On the other hand, standardised tests are widely used in Luxembourg, Finland, Korea, the United States, Poland, Denmark, Sweden and Norway, where over 95% of students attend schools that assess their students at least once a year.

Capacity at the Point of Delivery

Again, it cannot be overemphasised that the quality of an education system cannot exceed the quality of its teachers and principals. High-quality school systems pay attention to whom and how they select and the training provided. They closely study how they can improve the performance of those who are struggling in teaching; how they structure teachers' pay packets; and how they reward their best teachers. They provide an environment in which teachers work together to frame and share good practice. In these systems, teachers conduct field-based research to confirm or disprove the approaches they develop, and teacher appraisals are also based on whether these approaches are adopted in the classroom.

Incentives and Accountability

Success in high-performing education systems is associated with incentives and accountability, and how these are aligned across the system. It also has to do with how vertical accountability to superiors is balanced with horizontal or professional accountability towards peers.

For students, this affects the strength, direction, clarity, and nature of the initiatives being carried out at each stage of their educational career. It also impacts the degree to which students have incentives to take tough courses, to study extra hard, and the opportunity costs for staying in school and performing well. It also means providing incentives for teachers to make innovations in their pedagogies or within their organisations, to improve their own performance and the performance of their colleagues, and to pursue professional development opportunities that will lead to stronger pedagogical practices for the ultimate purpose of improving student learning outcomes.

High-performing systems tend to strike a balance between vertical and lateral accountability and have effective instruments to manage and share knowledge and to spread innovative practices through communication with all stakeholders within the system. PISA results suggest that school autonomy in defining curricula and assessments correlates positively to the system's overall performance. For example, systems that provide schools with greater discretion in making decisions regarding student assessment policies, courses offered, course content and textbooks used tend to perform better.

More importantly, autonomy and accountability need to be seen as complementing each other and not as mutually exclusive. Records from PISA reveal that systems where most schools post-achievement data publicly and show greater discretion in managing their

resources are likely to demonstrate higher levels of performance.

A Learning System

The success of an educational system is no longer simply benchmarked against national standards. Some of the best-performing countries are actively looking at internationally recognised systems as benchmarks and indicators in order to chart their achievement scores and plan for improvement.

A key ingredient in measuring success is teacher evaluation. An effective teacher appraisal system can help improve teachers' practices by identifying strengths and weaknesses for further professional development and in so doing, help them to improve upon their current practices. This involves helping teachers learn about, reflect upon, and adjust their practices if required. Teacher appraisal can also help to hold teachers accountable for their performance in enhancing student learning. In many high-performing systems, teacher appraisal is often linked with performance-based salaries, increments and career advancement prospects.

Countries typically either focus on improvement or on accountability due to the complexity and difficulty that can arise when the two are fused. In Finland, for example, when evaluation concentrates on improving practice, teachers are willing to reveal their weaknesses in the hope that conveying such information will lead to more effective decisions on developmental needs. However, when teachers are confronted with potential consequences for their career and salary, they tend to be less inclined to reveal weaknesses in their performance and the improvement element, which is based on trust built in the relationship between the appraiser and the appraised, can be compromised.

Effective appraisal requires the development of considerable expertise in the system, including training evaluators, establishing clear evaluation processes, and aligning broader school reforms such as professional development opportunities with evaluation and assessment strategies. All of these require substantial resources, not least, the investment of time and manpower.

Resources where They Yield Most

The most impressive outcome of world-class education systems is the delivery of high-quality learning consistently across the system such that every student benefits from the excellent learning opportunities offered. To achieve this, high-performing systems like Shanghai invest in educational resources where they can make the most difference, aim to attract the most talented teachers into the most challenging classrooms, and prioritise spending choices to focus on raising the quality of teachers.

PISA results confirm the weak correlation between educational resources and student performance, with more variation explained by the quality of human capital (i.e., teachers and school principals) than by material and financial assets alone, particularly among the industrialised nations. At the level of the educational system and net national income, the only type of resource that appears to be correlated with student performance is the level of teachers' salaries relative to national income. Teachers' salaries are related to class size, and if spending levels are similar, school systems often make trade-offs between smaller classes and higher salaries for teachers. The findings from PISA suggest that systems prioritising higher teachers' salaries over smaller classes, such as in Japan and Korea, tend to perform better. A school system that lacks teachers, infrastructure, and textbooks tends to perform poorly. However, given that most school systems surveyed by PISA appear to satisfy the minimum resource requirements for teaching and learning, the lack of relationship between many of the resource aspects and both equity and performance may result simply from insufficient variation in performance caused by differential resource allocations among the OECD countries studied.

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Coherence

In high-performing systems, there is a great coherence and consistency in the implementation of the policies and practices and, as a result, there is also sustainability in the initiatives introduced. PISA results reveal that success is within reach for nations that have the capacity to create and execute policies with maximum coherence across the system. The path to reform is not easy and it can be fraught with political controversies. Moving away from administrative and bureaucratic controls in order to implement professional norms can be counterproductive if a nation does not yet have teachers and schools with the capacity to implement these policies and practices. Pushing authoritative power downwards can be problematic if there is no agreement on what students need to know and what they should be able to do. Recruiting high-quality teachers will not benefit the system if those who are recruited are frustrated by what they perceive to be a mindless system of initial teacher education. They may not be willing to participate, or in the worst-case scenario, decide to turn to another profession. The same applies to those teachers who are unable to withstand the bureaucracy within the schools that they teach, and they may eventually leave the profession.

Conclusion – Successful Reform Trajectories

Seven key elements that characterise high-performing education systems have been highlighted. In the past, when only a small number of well-educated people were needed, it was efficient for governments to invest a large sum to fund the elite minority to prepare them for their roles in leading the country. However, the current reality is that social and economic costs of low educational performance have risen substantially and all young people are required to leave school with strong foundational skills in basic literacy and numeracy.

It used to be assumed that what was learned in school will last for a lifetime, where teaching content and routine cognitive skills was at the heart of our educational goals. Today, the focus is on enabling people to become lifelong learners and to manage complex ways of thinking and complicated ways of working that computers cannot substitute easily.

In the past, some teachers had only a few years more of formal schooling compared to their students. There was a time when governments tended to employ customised methods of administrative control and accountability to get the results they wanted. Nowadays, the challenge is to make teaching a profession meant for high-level knowledge workers. These knowledge-based teachers would prefer not to teach in schools where administrative forms of accountability, bureaucratic commands and control systems rule the day. To draw talented individuals, and more importantly to retain them, successful education systems have transformed their organisational structures into professional ones where evolving norms complement bureaucratic and administrative forms of control.

TRENDS AND PRACTICE OF TEACHER POLICIES

PROFESSOR ANDREAS SCHLEICHER

2 NOVEMBER 2011, SEMINAR TO NIE STAFF, NIE, SINGAPORE

This seminar was delivered to all NIE faculty, research and administrative staff. This session generated much interest and prompted questions from the audience. A summary of the key points of the seminar is presented below.

Abstract

When one could still assume that what is learned in school will last for a lifetime, teaching content and routine cognitive skills was rightly at the centre of education. Today, where individuals can access content on Google, where routine cognitive skills are being digitised or outsourced and where jobs are changing rapidly, education systems need to enable people to become lifelong learners, to manage complex ways of thinking and complex ways of working that computers cannot take over easily. That requires a very different calibre of teachers. When teaching was about explaining prefabricated content, school systems could tolerate low teacher quality. And when teacher quality was low, governments tended to tell their teachers exactly what to do and exactly how they wanted it done, using prescriptive methods of administrative control and accountability. Today, the challenge is to make teaching a profession of high-level knowledge workers. And people who see themselves as candidates for the professions are not attracted by schools organised like an assembly line, with teachers working as interchangeable widgets. This lecture shows how many countries are striving to raise the quality of the teaching profession, with the status, professional autonomy, and the high-quality education that go with professional work, with effective systems of teacher evaluation and with differentiated career paths for teachers.

Introduction

With globalisation and the rapid evolution of knowledge and technology, the set of skills needed for success in the 21st century has changed significantly. Education plays a crucial role in preparing students to become lifelong learners, to manage complex ways of thinking

TRENDS AND PRACTICE OF TEACHER POLICIES

PROFESSOR ANDREAS SCHLEICHER

2 NOVEMBER 2011, SEMINAR TO NIE STAFF, NIE, SINGAPORE

and working, and to acquire the ability to connect and exchange ideas with others. Education is ultimately about student learning outcomes and has to do with the quality of instruction, interventions and support systems, which in turn are shaped by key stakeholders such as teachers, principals and families. The increasing challenge of teaching in the 21st century means that there is not only a need for a very different calibre of teachers who are high-level knowledge workers, but also to develop effective education systems to recruit, prepare and retain such teachers.

Drawing on comparative data from OECD's international research on education practices and innovations, three issues are discussed, namely teacher recruitment and preparation, professional development and support, and teacher evaluation and compensation.

Teacher Recruitment and Preparation

Many countries are facing difficulties in recruiting teachers. Even where there is stability in the supply and demand of teachers, many countries still encounter shortages of specialist teachers or experience an unequal distribution of teachers in disadvantaged communities. However, there are also countries that have successfully made teaching an attractive career. In 2010, top-performing country in internationally benchmarked tests, Finland, received 10 times more applicants than they had vacancies for, that is, over 6,000 applicants for 600 teaching positions despite the fact that salaries for teachers in Finland are just average compared to other OECD countries.

So what can be done in order for the teaching profession to have an edge over other sectors when competing for talent? Factors affecting successful and competitive recruitment are discussed next.

Spending choices on education

High-performing education systems believe in devoting substantial amounts of resources to the classrooms and tend to prioritise the quality of teachers over the size of classes. A good example is Korea, which not only pays teachers well but also provides them with ample time to engage in other tasks such as lesson preparation, teacher collaboration, and professional development. The excellent welfare provided for teachers together with the long school days have driven up classroom spending, and Korea has had to resort to large classes in order to finance the rising cost of education.

Relative pay

In terms of how well teachers are paid relative to other graduate employees, the OECD data shows that teachers' salaries in most countries are below those of graduates engaged in other professions and often experience a decline in relative terms with an increase in years of service, that is, teachers' salaries get comparatively lower compared to those in other professions who have stayed for just as long a period. However, in countries like Japan and Singapore, the government closely tracks changes in the pay of professionals to ensure that the salaries of teachers remain competitive relative to other professions.

Factors shaping teachers' pay

All systems reward their teachers for the years of seniority. Most will further compensate those taking on additional management responsibilities or special tasks. For example, many will provide financial incentives to attract teachers into teaching in disadvantaged areas or challenging schools. A higher initial educational qualification and certification or training acquired during the teacher's professional life are also typically rewarded to encourage teachers to upgrade their professional skills and knowledge. Besides monetary rewards, teachers with outstanding performance are also often offered better career prospects and diversity of roles.

It is interesting to note that teachers' often perceive non-monetary gains to be of greater importance compared to monetary rewards. According to OECD surveys, what teachers value more are the social relevance of

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teaching, working with young people, opportunities to display creativity, a greater sense of autonomy, and their working relationship with their colleagues.

Status of teaching

The general perception is that the social status of teachers is determined by how much society respects the teaching profession. The OECD data, however, suggests the reverse: it is the nature of the profession that is creating the teachers' image. If teachers are given ownership of their professional standards and are able to secure strong parent–teacher interaction, they will possibly get a very different social status. Therefore, it is important to understand that the image of teachers is, in fact, created by the kind of people that the education systems have nurtured and their sense of values.

Trend towards greater school autonomy

Over the past decade, many systems have granted significantly more autonomy to schools. The trend in OECD countries in previous years has been towards putting in much effort to build local capacity in schools and leadership capacity within the teaching profession. The increasing level of professional autonomy and responsibilities entrusted to schools and teachers have made teaching a respectable and sought-after profession in high-performing systems.

Initial teacher preparation

The attractiveness of the teaching profession and the quality of teacher education provided are closely linked. It is difficult to attract high-calibre candidates into teaching if they perceive teacher education colleges to have a low status. Consequently, countries that have succeeded in improving the quality of their teaching workforce have often raised the standards of admission into their teacher education programmes. Equally important are transparent standards of what teachers are expected to know and be able to do in specific subject areas. In many high-performing systems, teacher education is not just about providing sound basic training in subject-matter knowledge and pedagogy but also to develop skills for reflective practice and on-the-job action research. Finland, Japan and Shanghai provide great examples of how teachers obtain and use their research skills to improve their practice and that of their profession in systematic ways. In addition, many countries have shifted the emphasis from academic preparation to preparing professionals in schools instead. Teachers now get into classrooms earlier, spend more time on-site in schools, and get more and better support in the process.

Professional Development and Support

No matter how good an initial teacher preparation programme is, it cannot be expected to prepare teachers for all the challenges they will face throughout their career. Successful reform requires investment in quality professional development in order to:

- update the subject knowledge of teachers;
- update teachers' skills and approaches in the light of new teaching techniques, new circumstances, and new research findings;
- enable teachers to master changes made to curricula or teaching practice;
- enable schools to develop and apply new strategies;
- facilitate exchange of experiences; and
- help weaker teachers to become more effective.

Effective professional development needs to be ongoing, including training, practice and feedback, and opportunity for follow-up in a systematic way. It also needs to be linked with appraisal, feedback, and school evaluation. Interestingly, OECD's data shows that teachers' participation in professional development goes hand-in-hand with their mastery of a wider repertoire of pedagogical practices, as well as a close relationship between professional development, a positive school climate, co-operation between teachers, and teacher job satisfaction.

While countries like Shanghai and Singapore have placed great importance on professional development, the types and intensity of such support given to teachers

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vary internationally. Briefly, here are some findings from OECD's study on comparative professional development systems internationally.

Induction and mentoring

Well-structured and heavily resourced induction programmes can support new teachers in their transition from beginning teachers to professional teachers. However, OECD data shows that a substantial number of teachers are left without formal induction or mentoring, and this is a major concern of many countries.

Barriers to professional development

The OECD study indicated that relatively few teachers had participated in the kinds of professional development that they believe would greatly impact their work, namely formal academic qualification programmes and individual as well as collaborative research. The teachers reported that their demand for professional development was often not met and the most common reasons they gave were conflict with their work schedule and the lack of suitable opportunities for professional development. In addition, they consistently reported that their greatest need for professional development was to learn how to handle differences in student learning styles and backgrounds, using information and communication technologies effectively, and improving student behaviour both inside and outside the classroom.

Collaboration

In most countries, there is evidence of informal exchange and professional co-ordination and collaboration amongst teachers. However, there rarely exists deep professional collaboration that is structured around students and where teachers work together on a sustainable basis. Embedding collaboration in the culture of teaching is important as data from PISA shows that teachers who do collaborate have reported better teacher–student relations in their schools. Positive teacher–student relations are not only good predictors of student achievement in PISA, they are also closely related to teachers' job satisfaction.

Career development for teachers

Equally important to teachers are career opportunities and most successful countries have a working environment that allows teachers to grow in their career. Some factors that OECD has found to be of importance in retaining teachers are:

- The quality of their relations with students and colleagues, feeling supported by their school leaders, good working conditions, and opportunities to develop their skills.
- Promotional criteria involving teachers spending less time in classrooms. Some countries achieve greater career diversity by creating positions associated with specific roles in addition to classroom teaching; others have structured careers in ways that provide additional responsibility, status, and compensation for teachers with superior teaching skills.
- Effective instructional leadership, which is central in helping teachers feel valued and supported in their work.

Teacher Evaluation and Compensation

Effective appraisal requires the development of considerable expertise in the system, including training evaluators, establishing evaluation processes, and aligning broader school reforms such as professional development opportunities with evaluation and assessment strategies.

The criteria on which teachers are evaluated vary considerably across countries. They include:

- teacher qualifications in terms of their credentials, years of service, degrees, and professional development;
- how teachers work in the classroom setting; and
- measures of teacher effectiveness, which usually involve an assessment of how well teachers contribute to student achievement as well as their knowledge of their field and pedagogical practices.

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A well-designed teacher evaluation system is one that constitutes a meaningful combination of two functions, namely the improvement function and the accountability function. The former comes about when the appraisal helps to identify strengths and weaknesses, allowing teachers to learn about, reflect on, and adjust their practice. The accountability function can help hold teachers accountable for their performance in enhancing student learning, and it is often linked with performance-based career advancement and salaries.

In reality, it is difficult to strike a balance between the objectives of improvement and accountability. When teachers are confronted with potential consequences for their career and salary, they tend to be less inclined to reveal the weaknesses in their performance, and the improvement function, which is based on trust in the relationship between appraiser and the appraised, can be compromised.

Nevertheless, the Teaching and Learning International Survey (TALIS) shows that for teachers who received feedback, 8 in 10 considered the assessment given to them as fair. More than three-quarters of the teachers also regarded it to be helpful in their work, while the majority said it improved their job satisfaction and development as teachers, without reducing job security. Most importantly, they claimed that appraisal leads to changes in specific aspects of their teaching.

While teachers highly value feedback on their work, many lament that the school systems often compensate teachers more for seniority, than for good performance. About 75% of the TALIS survey participants said that they receive no recognition for improving the quality of their teaching and are not rewarded for being innovative. Only over a quarter said that teachers would be dismissed because of sustained poor performance. All these point towards a need for a systemic review of those who design evaluation activities, those who undertake them, and those who use the results.

Conclusion

Successful implementation of teacher policies requires a coherent, systemic response – an education system that is receptive to best practices, as well as teachers and schools with the capacity to effectively implement them. Hence, it is crucial to ensure alignment and coherence of policies and practices across all aspects of the system – the work organisation, the teacher selection and preparation process, teacher professional and career development, and teacher evaluation systems.

SKILLS FOR THE 21ST CENTURY

TRANSLATING BETTER SKILLS INTO BETTER ECONOMIC AND SOCIAL OUTCOMES

PROFESSOR ANDREAS SCHLEICHER

3 NOVEMBER 2011, CJ KOH PROFESSORIAL LECTURE, CIVIL SERVICE AUDITORIUM, SINGAPORE

The public lecture is the flagship event of each CJ Koh Professorship visit. It was attended mainly by educators from different sectors of the education system.

Abstract

Everyone knows being skilled is an advantage: Skilled workers are more productive and therefore tend to earn more and have better employment prospects. Greater productivity, in turn, is the foundation for sustainable economic growth in countries, and failure to ensure a good skills match has short-term consequences (skills shortages) and becomes a longer-term drag on growth and equality of opportunities. Most governments have understood that, and public spending on education and training alone represents 13% of total public expenditure in the industrialised world. The trouble is that there is no automaticity in these relationships: Skills do not automatically translate into higher incomes and high productivity, and there is good evidence that systems can do better in both developing and making use of the skills of the workforce. Success with converting skills into jobs and growth will depend on a good understanding of what those skills are that drive strong, sustainable and balanced economic outcomes; whether the right mix of skills is being taught and learned in effective, equitable and efficient ways; whether economies and labour markets are able to fully utilise their skill potential; and whether governments can build strong coalitions with the business sector and social investors to find sustainable approaches to who should pay for what, when and where. This lecture examines internationally comparative evidence in this field.

Introduction

In today's world, it is essential that countries and their people translate their improved skills into better economic and social outcomes. Skills matter for both individuals and economies. Skilled workers are more productive and therefore tend to earn more and have

better employment prospects. Greater productivity, in turn, is the foundation for economic growth and prosperity. However, results from OECD's Programme for the International Assessment of Adult Competencies (PIAAC) show that skills do not automatically translate into higher incomes and higher productivity. Failure to ensure a good skills match has short-term consequences (e.g., skill shortages) and may become a longer-term drag on growth and equality of opportunities. Success with converting skills into jobs and economic growth depends on:

- whether we have a good understanding of what those skills are that drive strong, sustainable, and balanced economic outcomes;
- whether the right mix of skills is being taught and learned in effective, equitable, and efficient ways;
- whether economies fully utilise their skill potential; and
- whether governments can build strong coalitions with the business sector and social partners to find sustainable approaches to govern who should pay for what, when and how.

Dramatic Expansion of Higher Education

Many systems have done well in getting more people to obtain higher academic qualifications. There has been a dramatic expansion of higher education across the world. In most of the 39 OECD countries, both the college graduation rate and investment per college student each year have increased significantly in the course of 14 years from 1995 to 2008.

The expansion of higher education has had two important implications on the global talent pool. The first relates to the size of this global talent pool. Among the age group nearing retirement, there are 39 million people with a tertiary qualification, while there are 81 million among the age group entering the labour force. Interestingly, the increase in knowledge workers has not led to a decline in their pay, which has happened to the lowly skilled workers. In other words, the demand for better qualified people continues to rise.

The second implication has to do with the composition of the global talent pool. While in the older age group every third person in the talent pool was from the United States, it was only every fifth person in the younger age group. China's share of this global talent pool has expanded from less than 7% among the older age group to 18% among those who have just entered the labour market – just 2 percentage points below that of the US. However, obtaining formal qualifications is the easy part. The certifications and degrees that people have obtained are not an exact mirror of the skills required today.

Qualifications vs. Skills

Formal qualifications cannot be equated with actual skills. The certification that people get once in their life is not an exact representation of their skill sets. Results from the PIAAC show that not everyone who is a high-school dropout is unskilled. In some countries, the performance of adults with high school and university qualifications is rather similar. More interestingly, secondary school graduates in some countries are about as highly skilled as the university graduates in other countries. The essential implication is not that people vary in their abilities because the quality of the universities in different countries varies. Rather, it indicates the significance of skill development after the completion of basic certifications or degrees.

Changing Demand for Skills

It is important that we look at skill utilisation in a dynamic framework because the demand for skills keeps changing as economies and societies evolve. Among the skills categories (routine manual, non-routine manual, routine cognitive, non-routine analytic, and non-routine interactive), routine cognitive, which is cognitive work that you can easily put into the form of a script, has seen the sharpest decline in demand over the last couple of decades. Therefore, schools are now challenged on where they have traditionally put much of their focus –

multiple-choice tests. The skills that are easiest to teach and test are also the skills that are easiest to digitise, automatise and outsource.

The most needed workers in the 21st century workforce include:

- great collaborators and orchestrators;
- great synthesisers;
- great explainers;
- great versatilists;
- great personalisers; and
- great localisers.

Skills matter for individuals

Skills matter for individuals because skills have an increasing impact on labour market outcomes and social participation. People with lower level skills tend to earn lower incomes and tend to be at higher risk of being unemployed. If people lack foundational skills, they are more likely to be in poor health, are less likely to volunteer, and have less of an understanding of political issues facing their own country. They are also less likely to trust institutions and people, constantly thinking that others are taking advantage of them. Finally, those with poor skills also show low levels of political efficacy, that is, they tend to believe that politicians do what they want and that they themselves have no influence on policy formulation and implementation.

Skills matter for economies

Skills matter for economies because failure to ensure a good skills match has both short-term consequences (skill shortages) and long-term effects on economic growth and equality of opportunities. A measure of the quality of education, in the form of the scores of the different world regions on international tests like PISA or TIMSS, indicates a close relationship between test scores and economic growth. The relationship holds even when other factors are taken into consideration. It even holds when comparing growth in economies with learning outcomes. What this implies is that it is not simply years of schooling or the number of graduates we produce, but indeed that the quality of learning outcomes matters for economic development.

Producing 21st Century Skills

There are many factors that we need to consider in order to produce 21st century skills. For example, what are the drivers of the future and current demand for skills? How do we ensure responsiveness and relevance of educational provision to labour demand? How do we optimise access to education and training throughout life? What is the impact of migration and international labour mobility on skill formation systems?

Policy needs to pay attention to producing an effective skill mix to ensure that the stock of skills matches demand. Producing skills is not just about delivering more of the same skills because the demand for skills keeps changing. The toxic mix of skill shortages and high levels of unemployment, which is plaguing many OECD countries today, typically reflects this.

Skills policies must also have an eye to the future. To form the workforce of the future, you need a vision of the evolution of the labour market and of the dispositions, knowledge and skills that will allow individuals to prosper. We also need to remain attuned to the varying demands and constraints that individuals face at different stages in their lives and to the pathways that they follow through education and training into work.

Optimising the Use of Skills

Producing the best skills in the world is not of much use if economies do not deploy those skills optimally. Underutilisation of skills – whether because of mismatch between workers' skills and those demanded by the job or because individuals are out of the labour market altogether – represents a waste of the resources invested in nurturing these skills. To optimise the use of skills, the questions below represent the key factors that need to be considered when designing skills policies:

- Which measures help optimise the utilisation of skills on the job?
- How can workforce participation be boosted?
- Which tools facilitate the recognition of skills?
- How can transparency of skills systems be ensured?
- What information is necessary to facilitate matching of skills?

Failure to make active use of skills may lead to a depreciation of existing skills. In most countries, substantial proportions of the working-age population are out of work and not using their skills productively. The crisis has only exacerbated the situation. Education systems that try to compress everything into a few years before people enter the labour market are not going to see the long-term returns they are looking for. Too much emphasis has been put on the front-loading of education. It is of great significance to distribute learning more equally over people's lifespan, enabling people to accumulate degrees and certificates bit by bit as they become older. Skills policies should allow people to use their skills and to interact between work and education.

In the past few decades, there has been a steady change in the industrial and occupational structure of employment. In particular, strong growth in occupations requiring higher level skills has been observed. In some emerging countries, these changes have become much more radical and will therefore require substantive modifications in the skills supply over a very short period of time. The challenges, which those changes in occupational profiles pose for skills policies, become clear when we take into account that different occupations require very different skills profiles. It is very difficult to transform an unemployed person previously doing a low-level skill job into a high-level knowledge worker. As people move from producing goods to high-level knowledge work, they need to develop not just more but also different skills.

Making Effective Investment in Skills Development and Utilisation

Strong incentives for individuals

In the 21st century, there should be strong incentives to shift more responsibility to the learner. The promise of large earnings and better labour market prospects for higher educated workers in the US translate into substantial economic gains over one's working life. In the US, every individual takes US$323,000 more within a life cycle than what they had invested in higher education. Rather than being an indication that the U.S. higher education system is great, what this essentially tells us is that the labour market is very responsive to skills. One of the most challenging developments for the future of education is that we are seeing more and more responsibility placed on the individuals to manage their own lives. An essential task for all countries is to motivate their people to continue upgrading their skills.

Strong incentives for governments

From the perspective of the public, additional taxes and social contributions paid by tertiary graduates make investment into this level of education very profitable. Further expanding higher education to meet labour market demands makes good economic sense from the society's point of view.

How we can do better?

As we have seen from the above discussion, there are quite a number of policy issues to resolve:

- some people have poor foundational skills;
- shortages and skills gaps exist;
- skills are underutilised (unemployment, low rates of labour market participation);
- there is evidence of mismatch; and
- are we skilling for future jobs (quantity and quality)?

Policymakers must consider carefully the short-term and long-term priorities, which is a tricky question for governments in the 21st century. It would be inappropriate

for governments to leave this decision to individuals because they often make inefficient choices in the long term. However, most countries prioritise the present against the future. All social problems that confront us today are about the choices of the future and the present (e.g., environmental problems, financial crisis).

The following are some short-term suggestions for governments:

- Mobilise and develop comparative intelligence on skills and skills utilisation;
- Prioritise investment of scarce resources in skills development;
- Foster peer learning and look at skills beyond the nation-state; and
- Contribute to building strategic partnerships for policy implementation.

What are the long-term challenges? Essentially, there are five pillars we need to consider:

- Pillar 1: Labour market responsiveness
- Pillar 2: Attention to quality
- Pillar 3: Adequate skill use
- Pillar 4: Open/equal access
- Pillar 5: Effective partnerships

Conclusion

In the 21st century, the only way for us to "grow our way out" is through education, giving more people the tools to invent, compete, collaborate and connect in a way that drives our economies forward. If people have the skills from education to take advantage of the IT revolution, they are going to be fine. If people do not have adequate education, they will have serious problems fitting into the 21st century global workplace and society.

SINGAPORE: FIVE DAYS IN THINKING SCHOOLS AND A LEARNING NATION*

BLOG POST IN *EDUCATION TODAY* BY PROFESSOR ANDREAS SCHLEICHER

I had always been interested in Asia's success story of Singapore, that transformed itself from a developing country to a modern industrial economy in one generation. This year I had the opportunity of a visiting professorship at Singapore's National Institute of Education (NIE) to learn more about this country. If I had to summarise what I learned in one sentence, this is a story about political coherence and leadership as well as alignment between policy and practice; about setting ambitious standards in everything you do; about focusing on building teacher and leadership capacity to deliver vision and strategy at the school level; and about a culture of continuous improvement and future orientation that benchmarks educational practices against the best in the world.

At the institutional level, both policy coherence and fidelity of implementation are brought about by a strategic relationship between the Ministry of Education, the NIE and the schools. That's not just words. The reports I received from policymakers, researchers and teachers were entirely consistent, even where they represented different perspectives. NIE's dynamic director, Lee Sing Kong, meets the Minister on a weekly basis. NIE professors are regularly involved in ministry discussions and decisions, so it is easy for NIE's work to be aligned with ministry policies, and school principals learn about major reform proposals directly from the Minister, rather than through the media. Teacher education programmes are designed with the teacher in mind, rather than to suit the interests of academic departments. Teachers typically go into the field with a first degree, the Master's programme serves to frame the practical experience gained in schools within a coherent theoretical

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underpinning later in mid-career – and I met plenty of teachers who took that up and continue their education while in the profession. In recognising the need for teachers to keep up with the rapid changes occurring in the world and to be able to constantly improve their practice, every teacher is entitled to 100 hours of professional development per year. Teacher networks and professional learning communities encourage peer-to-peer learning and the Academy of Singapore Teachers was opened in September 2010 to further encourage teachers to continuously share best practices.

The usual complaint that teacher education does not provide sufficient opportunity for recruits to experience real students in real classrooms in their initial education isn't unknown in Singapore. It is simply difficult, disruptive and expensive to get an annual cohort of 2000 teacher recruits into classrooms. So what to do? Do like Stanford and establish the world's premier teacher education institution with clinical experience for a hundred students per year and let the rest of the country sink? Singapore is not the US where teacher policy is a function of myriad decisions made by local authorities who often have no idea how their decisions are actually affecting the quality of the teaching profession. So Singapore has gone the other way round – on top of school practicum attachments of between 10 to 22 weeks, NIE is currently bringing the digital used in classrooms into pre-service education, with technology enabling real-time access to a selection of the country's classrooms, in ways that don't distract schools from their core business and at the same provide student-teachers with insights into classroom experience in many schools, rather than have a few idiosyncratic experiences only. NIE also carries out an amazing range of classroom-oriented research to help teachers personalise learning experiences, deal with increasing diversity in their classrooms and differences in learning styles, and keep up with innovations in curricula, pedagogy and digital resources.

It is also striking to see how teaching talent is identified and nurtured rather than being left to chance. Like all government employees and many other professions in Singapore, the teachers' performance is appraised annually by a board and against 13 different competencies. These are not just about academic performance, but include teachers' contribution to the academic and character development of the students in their charge, their collaboration with parents and community groups, and their contribution to their colleagues and the school as a whole. It was intriguing to see how teachers didn't seem to view this as a top–down accountability system but as an instrument for improvement and career development. Teachers who do outstanding work receive a bonus from the school's bonus pool. After three years of teaching, teachers are assessed annually to see which of three career paths would best suit them – master teacher, specialist in curriculum or research, or school leader. Importantly, the individual appraisal system sits within the context of great attention to the school's overall plan for educational excellence.

PISA data show that schools in Singapore have comparatively limited leeway in making hiring decisions. But I learned that the principal of the school to which student-teachers are attached will sit on the recruitment panel and weigh in on decisions about the recruitment of the people they could end up with, well aware that wrong recruitment decisions can result in 40 years of poor teaching. So it's not all just about your school, but about the success of the system.

I could see how all of this plays out in practice in Qifa Primary School. It was the experience you would expect in Singapore, a charismatic school leader, an engaged team of teachers with a critical and collaborative mindset, and disciplined and yet cheerful students. But what impressed me most was a visit to one of Singapore's three Institutes of Technical Education (ITE) which cater for the bottom quarter of school performers. I had long wanted to see how the country deals with these students. I was received in the school's restaurant which, entirely managed and run by students, almost looks like

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an upgraded Lau Pa Sat with air-conditioning, serving dishes from a dozen countries and cultures, a symbol of a country that doesn't see culture as an obstacle but seeks to capitalise on its diversity.

I visited a classroom where a visiting Australian chef was captivating a group of students with an interactive presentation on the latest research on preparing meat, in a first-class learning environment equipped with the up-to-date technology. The facilities and amenities of the ITE were easily comparable to those of modern universities anywhere else. This is a country that invests the same amount of public money into every vocational student as the high school student going to its most prestigious university, that understands that the physical learning environment can shape the image of an institution and that prioritises the quality of teaching over the size of classes. And the ministry provides the ITE's with full budgetary autonomy over a 10-year budget envelope to facilitate long-term strategic planning and investment.

Clearly, Singapore seeks to break the East Asian mould where academic achievement is revered as the only route to success, recognising that students learn differently and differently at different stages in their lives. Once seen as a last resort, Singapore's ITE College West is now a place of choice for students, with 90% of graduates finding jobs in their chosen field, up from 60% decades ago. The ITE also sees a sizeable number of students who make it from the ITE to the polytechnic to the university and to anywhere in life. Principal Yek Tiew Ming explained how the ITE carefully follows its graduates for a decade to learn from their experience and success, and regularly brings successful alumni back to show its current students that the sky is the limit to achievement. The ITE's also provide good examples for building synergies between public provision and the business sector. Each technical field in the ITE's is advised by industries in that sector to keep it current with changing demands and new technologies. New programmes can be built for multinational companies looking to locate in Singapore.

All this has changed the way in which political leaders and educators view those students, no longer considering them as failures but as experiential learners. And I was impressed by the students of the ITE as much as by its principal and teachers.

I had taken the outgoing flight with a Western airline and the returning flight to Paris with Singapore Airlines; you fly with the same plane with the same technology, you eat similar food but you experience how much the sense of responsibility, dedication and diligence of the people in charge can make a difference to your experience as a customer.

There are important lessons the world can learn from Singapore. To those who believe that systemic change in education is not possible, Singapore has shown several times over how this can be achieved. To become and remain high-performing, countries need a policy infrastructure that drives performance and builds the capacity for educators to deliver it in schools. Singapore has developed both. Where Singapore is today is the result of several decades of judicious policy and effective implementation. On the spectrum of national reform models, Singapore's is both comprehensive – the goal has been to move the whole system – and public policy-driven. I was struck most by the following features.

Meritocracy. I heard not just from policymakers or educators but also from students of all ethnic backgrounds and all ranges of ability that education is the route to advancement and that hard work and effort eventually pays off. The government has put in place a wide range of educational and social policies to advance this goal, with early intervention and multiple pathways to education and career. The success of the government's economic and educational policies has brought about immense social mobility that has created a shared sense of national mission and made cultural support for education a near-universal value.

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Vision, leadership and competency. Leaders with a bold long-term vision of the role of education in a society and economy are essential for creating educational excellence. I was consistently impressed with the people I met at both the Ministry of Education and the Ministry of Manpower. These Ministries are staffed by knowledgeable, pragmatic individuals, trained at some of the best universities in the world. They function in a culture of continuous improvement, constantly assessing what is and isn't working using both data and practitioner experience from around the world. I was speaking with Minister Heng about our Skills Strategy only to realise that he had already studied most of my slides. They also respect and are respected by professionals in the NIE as in the schools. The close collaboration between policy, research and practice provides a guiding coalition that keeps the vision moving forward and dynamic, expecting education to change as conditions change rather than being mired in the past.

Coherence. In Singapore, whenever a policy is developed or changed, there seems enormous attention to the details of implementation – from the Ministry of Education, to the National Institute of Education, cluster superintendents, principals and teachers. The result is a remarkable fidelity of implementation which you see in the consistency of the reports from different stakeholders.

Clear goals, rigorous standards and high-stakes gateways. The academic standards set by Singapore's Primary School Leaving Examination and O- and A-levels are as high as anywhere in the world, and that is also what you see from their results in PISA. Students, teachers and principals all work very hard towards important gateways. Rigour, coherence and focus are the watchwords. Serious attention to curriculum development has produced strong programmes in maths, science, technical education and languages and ensured that teachers are well-trained to teach them. Having been very successful as a knowledge transmission education system, Singapore is now working on curriculum, pedagogy and assessments that will lead to a greater focus on high-level, complex skills.

High-quality teachers and principals. The system rests on active recruitment of talent, accompanied by coherent training and serious and continuing support that promote teacher growth, recognition, opportunity and well-being. And Singapore looks ahead, realising that as the economy continues to grow and change it will become harder to recruit the kind of top-level people into teaching that are needed to support 21st century learning.

Intelligent accountability. Singapore runs on performance management. To maintain the performance of teachers and principals, serious attention is paid to setting annual goals, to garnering the needed support to meet them and to assessing whether they have been met. Data on student performance are included, but so too are a range of other measures, such as contribution to school and community, and judgements by a number of senior practitioners. Reward and recognition systems include honours and salary bonuses. Individual appraisals take place within the context of school excellence plans. While no country believes it has got accountability exactly right, Singapore's system uses a wide range of indicators and involves a wide range of professionals in making judgements about the performance of adults in the system.

So is there nothing that Singapore can learn from the world? Actually there are a number a points.

You can mandate good performance, but you need to unleash greatness. Finland provides an example for how you can shift the focus from a regulating towards an enabling policy environment. Perhaps it was no surprise then that when I met State Minister Wong for lunch, he had just returned from a visit to Finland.

SINGAPORE: FIVE DAYS IN THINKING SCHOOLS AND A LEARNING NATION*

BLOG POST IN *EDUCATION TODAY* BY PROFESSOR ANDREAS SCHLEICHER

Singapore's educators realize that the skills that are easiest to teach and easiest to test, are also the skills that are easiest to digitize, automate and outsource; and that value is less and less created vertically through command and control and increasingly so horizontally by whom you connect and work with. There is much talk about educational success being no longer about reproducing content knowledge, and efforts initiated to develop imaginative skills to connect the dots and to anticipate where the next invention will come from; about ways of working, including communication and collaboration; and about the tools for working, including the capacity to recognise and exploit the potential of new technologies. And more than that, the centre of the current discussion is now on ethics, values and the capacity of students to live in a multi-faceted world as active and engaged citizens. But Singapore's educators, like educators elsewhere, struggle with finding appropriate answers to what students should learn, the ways in which they can learn these broader competences and how teaching and schooling needs to change to achieve this.

Despite building many bridges and ladders across the system, PISA shows how social background still creates important barriers for student success. Like others, Singapore finds that the emphasis on meritocracy alone provides no guarantee for equity, and that it takes effective systems of support to moderate the impact of social background on student and school outcomes and to identify and foster the extraordinary talents of ordinary students. Educators are inspired by the life-changing opportunities created at the Northlight School. There is also considerable interest in Shanghai's success with attracting the most effective school principals to the toughest schools and the most talented teachers to the most challenging classrooms as well as in Ontario's approach to creating awareness of and addressing social disadvantage.

While Singapore does so well in allocating public resources to maximise value for money, parents are spending significant resources on private tutoring. When measured in PISA metrics, private tutoring actually adds very little in value to the high quality education in Singaporean schools but it does, apart from the money, take up a disproportionate amount of student learning time. Singapore would make much better use of the country's economic and human resources by accepting rather than ignoring the demand for such more personalised learning and perhaps building it into the regular school days of public schools, as countries like Denmark or Finland have successfully done.

So, all in all, while there is a lot the world can learn from Singapore, there remain lessons too which Singapore can continue to learn from the world. In short, there seems always much to gain from education systems collaborating to address tomorrow's challenges to their strengths today.

EPILOGUE

PROFESSOR LEE SING KONG

DIRECTOR, NIE, SINGAPORE

I am extremely pleased to pen the epilogue to this well put-together 2nd CJ Koh Professorial Lecture Series that documents the key sharing and learning points in conjunction with the visit of Professor Andreas Schleicher, the Education Policy Advisor to the Secretary-General of the OECD. I applaud the team led by Series Editor Associate Professor Low Ee Ling, with an able, passionate, committed and competent team of Research Assistants, Associates and Executives from both the Office of Education Research and the Office of Teacher Education. This series is crucial in ensuring that the knowledge gleaned and exchanged from each CJ Koh Professor is not just documented but shared widely across key players across the educational community both locally and globally, so my sincere kudos to the entire team.

In this epilogue, I wish to share the key lessons that Singapore can offer to the world in terms of the repeated high performance in internationally benchmarked assessments such as the Programme in International Student Assessment (PISA) and, more importantly, what else Singapore can do in terms of keeping ahead of the curve.

Teacher Recruitment and Preparation

I have been interviewed many times on the question of, "What is at the heart of Singapore's educational success?" and key ideas I have shared during these interviews have appeared in reports by McKinsey & Company, OECD publications like *Strong Performers and Successful Reformers in Education: Lessons from PISA for the United States*, recent publications by international colleagues Marc Tucker and Vivien Stewart to name a few.

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As a teacher educator, I want to first start by stating that at the heart of Singapore's educational success is the quality of our teachers. This quality is ensured through rigorous selection and recruitment processes where only the top 30% qualify to apply and a further 50% of them do not make it past the selection interview. The second important ingredient is how the selected teachers are prepared through an evidence-based, values-centric initial teacher preparation programme. NIE's initial teacher preparation is one that is very strongly pivoted on three-pronged set of values (V) with skills (S) and knowledge (K) needed of a 21st Century teaching professional wrapped around the central pillar of values. The V^3SK framework represents the underpinning philosophy of teacher education at NIE. Key to this framework is a clear reiteration of NIE's belief that the learner is the centre of our teacher education mission. The V^3SK framework guides the design, delivery and enhancement of NIE's programmes and courses and aims to develop teachers who requisite values, skills and knowledge necessary to function in the 21st century classroom.

This framework is premised on three value paradigms: learner-centredness, teacher identity, and service to the profession and the community. Learner-centredness puts the learner at the heart of teachers' work, while the paradigm of teacher identity outlines the clear attributes the teacher must possess in order to bring about strong learning outcomes in a rapidly changing world. Service to the profession and the community spells out teachers' commitment to their profession through active collaborations with members of the fraternity and striving to be better practitioners with a view of benefitting the community as a whole. Finally, the skills and knowledge spelt out in this framework refer to key skills and knowledge competencies that 21st century teaching professional require in order to bring about 21st century literacies and learning outcomes. These skills and competencies are closely aligned with the Ministry of Education's articulation of desired student outcomes as outlined in their Curriculum 2015 (C2015) document. A research-informed teacher preparation programme coupled with a strong theory–practice nexus lies at the core of our pre-service teacher preparation programmes.

Teacher Remuneration, Evaluation, Professional and Career Development

Whilst recent research studies investigating what motivates student-teachers to join the teaching profession in Singapore have indicated most hearteningly that it is altruistic reasons such as the love for children or a desire to contribute back to society that most strongly motivates them to join the profession, yet, student-teacher and beginning teacher remuneration should also be highlighted as one of the success factors contributing to the high quality of teaching profession. This is because all student-teachers have their tuition fees paid for, and receive a monthly salary whilst still undergoing pre-service preparation. Additionally, upon graduating as beginning teachers, their starting salaries are pegged at equivalent levels to what beginning lawyers and doctors get paid. This competitive salary compensation is important to signal the recognition of teachers' contribution to society.

Singapore's teacher appraisal system was showcased as a discussion starter at the first international summit of the teaching profession held in New York in March 2011. Known as the Enhanced Performance Management System (EPMS), the system works on a planning, coaching and evaluation cycle according to a few performance dimensions of professional practice, leadership and management and personal effectiveness. Annual merit increments and individual performance bonuses are determined by the appraisal grade awarded by the respective reporting officers. Such a system not only allows teachers to work on areas of improvement but also incentivizes the top performing teachers to stay ahead of the curve.

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Teachers' professional development is seen as a lifelong continuum and especially so in the first five years of a teacher's career. A proper Beginning Teacher Orientation Programme (BTOP) inducts them into the profession including a few top-up courses deemed to be more relevant at the beginning teacher phase such as "partnering with parents" for example. All teachers receive 100 hours of free time for professional development purposes and whatever courses, higher degree qualifications they sign up for is also fully borne by the Ministry. Additionally, the Professional Development Continuum Model (PDCM) allows for in-service teachers to take up higher degree courses in a flexible delivery mode one module at a time with a huge percentage of the fees paid for by the Ministry.

Teachers' career pathways are also differentiated into three tracks, namely teaching, specialist and leadership. These differentiated tracks ensure that teachers in Singapore have sufficient scope to develop in their individual areas of strength be it in teaching, leadership or in curriculum design and development. Leadership development is also not left to chance as reporting officers are careful to identify at an early stage those with the potential to be developed as Heads of Departments, Vice-Principals and Principals. For these identified teachers, milestone programmes are mounted such as the Management and Leadership in Schools (MLS) programme meant for potential Heads of Departments and the Leadership in Education (LEP) programme to prepare Vice-Principals and Principals. Thus, the succession of future leaders of the education system is not left to chance but taken very seriously and those identified undergo milestone programmes carefully designed to prepare them for their future leadership roles in the system.

System Coherence and Goal Alignment

Whilst the previous few sections have highlighted distinctive characteristics of Singapore's teacher recruitment, preparation, compensation, evaluation and professional/career development which explain the high quality of teachers in the system, it is important to ask how it is possible to achieve such success at the systemic, national level. I have always articulated that at the heart of Singapore's educational success is the strong tripartite partnership that exists between the nation's teacher education institute, the Ministry of Education and the 360 schools in the country. Such a strong partnership has often been cited in international literature to be the envy of other nations because it ensures that research can influence policy while policy can be translated somewhat seamlessly into the school in practice. What helps the tripartite partnership to be realised in practice is also the fidelity in implementation system-wide of new educational initiatives and the ability of the system as a whole to respond coherently to new local and global initiatives to ensure that our young are prepared relevantly for the 21st century global workplace and society.

Looking Ahead: What Next?

In the many interviews I have participated in, I am always also asked to reflect upon what next to ensure that a high-performing system like Singapore continues to stay ahead of the league? My first response is that we must never, ever rest on our laurels, and we must continue to learn from other systems worldwide. For this reason, I am grateful for all the sharing that CJ Koh Professor Andreas Schleicher has done during his appointment because Singapore believes in learning from all other systems and adapting the learning points to suit our particular context of education. For example, it is not just top performers that we want to benchmark against but we also wish to learn from those who have made substantial improvement in their performance from one period to the next and who have helped the bottom performers to move closer to the international average or what is known as "levelling the tail". As no one model can be perfect or ideal, we must continue to research on and learn from other nations. To document current and exemplary practices in quality teacher preparation

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in math and science education for example, Singapore and the United States are co-leading an Asia-Pacific Economic Cooperation (APEC) project with leading universities in eight countries.

To end this epilogue, I need to emphasise that educational success cannot be achieved in a vacuum. It requires a holistic systemic effort of all stakeholders within the educational community, including professional associations and teachers' unions to come together to ensure that there is goal congruence and alignment in helping to prepare our students to face the ever-changing demands and challenges of the 21st century global workplace and society.

About the CJ Koh Professorial Lecture Series

The CJ Koh Professorial Lecture Series was launched by the Office of Education Research in 2011. It was conceptualised for the purpose of knowledge building and sharing with our internal, external and international stakeholders in education, who can benefit from the information shared during each CJ Koh Professorship visit.

Each year, outstanding professors in the field of education are hosted by the National Institute of Education under the CJ Koh Professorship in Education programme. The CJ Koh Professorship has been made possible through a generous donation by Mr Ong Tiong Tat, executor of the late lawyer Mr Koh Choon Joo's (CJ Koh) estate, to the Nanyang Technological University Endowment Fund.

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