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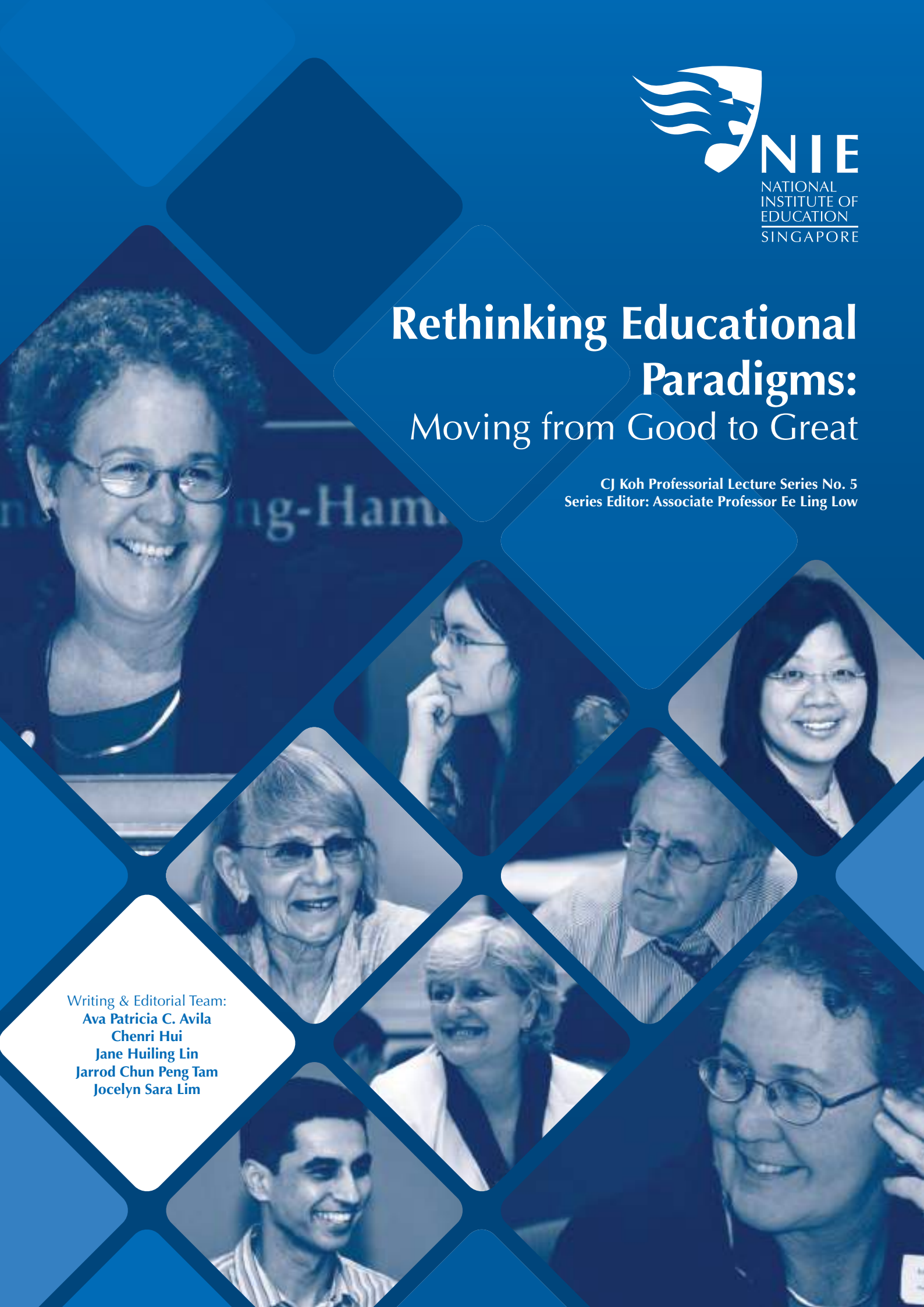
# Rethinking Educational Paradigms:
## Moving from Good to Great

**CJ Koh Professorial Lecture Series No. 5**
**Series Editor: Associate Professor Ee Ling Low**

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**Rethinking Educational Paradigms: Moving from Good to Great**
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# FOREWORD BY SERIES EDITOR

**ON BEHALF OF** the entire CJ Koh Professorship committee and the editorial team, I am delighted to present to you the fifth issue of the *CJ Koh Professorial Lecture Series*—"Rethinking Educational Paradigms: Moving from Good to Great". This is a consolidated report of three events conducted in association with the appointment of Professor Linda Darling-Hammond as our ninth CJ Koh Professor: the Keynote Lecture and Roundtable Discussion held during the 2013 Redesigning Pedagogy Conference organised on 5 June 2013, and the Public Lecture at held on the 6 June 2013.

The purpose of this report is to ensure that the insightful discussions arising from Professor Darling-Hammond's appointment reach out to colleagues at the National Institute of Education (NIE), the Ministry of Education (MOE) and the wider community for the purpose of adding to our understanding of both the local and global educational landscapes, to provide ideas for further research, and to inform future educational policy and practice.

The CJ Koh professorial appointments have been made possible through a donation of S$1.5 million to the Nanyang Technological University Endowment Fund by the late Mr Tiong Tat Ong, executor of the late lawyer Mr Choon Joo Koh's (CJ Koh) estate. The endowment serves the programme of the CJ Koh Professorship in Education. An additional sum of

# FOREWORD BY SERIES EDITOR

S$500,000 was donated to the endowment fund for the awards of the Pradap Kow (Mrs CJ Koh) Scholarship in Higher Degrees in Education.

In Professor Darling-Hammond's Keynote Lecture, "Teaching for Deeper Learning: Developing a Thinking Pedagogy", she gave a very enlightening and thought-provoking session, starting from the quantum expansion of knowledge creation leading to the changing demands of skills, and she then argued for the need of assessment reforms and the possibility of changing pedagogy in the classroom.

The Roundtable Discussion on "Nurturing Creativity and Innovation in Education System" was a lively conversation and sharing by the distinguished panellists (keynote speakers during the 2013 Redesigning Pedagogy Conference) and stakeholders of the Singapore Education System, and the discussion focused on students' and teachers' creativity and how creativity could be infused in the classrooms.

In the Public Lecture by Professor Darling-Hammond, "Improving Learning: What Can We Learn from Reforms around the World?", she painted a global picture of the educational reforms that are taking place and gave her insights on what is essential to take an education system to the next level. This article also includes the discussions that took place during the question-and-answer session.

I would like to take this opportunity to thank all who have contributed and made this report possible. To NIE Director Professor Sing Kong Lee and Dean of Education Research Professor Wing On Lee, thank you for being supportive of the *CJ Koh Professorial Lecture Series* from start to finish. To our distinguished discussion panellists, in alphabetical order, Ms Adora Svitak, Professor Bonnie Cramond, Professor Linda Darling-Hammond, Professor Deanna Kuhn, and Professor Neil Mercer, my sincere appreciation goes out to all of you who carved out time to contribute to the success of the roundtable discussion.

This consolidated roundtable report would not have been possible without the wonderful secretariat team which supported the writing from the first drafts to the final product you see today and the writing team (in alphabetical order), Ms Ava Patricia C. Avila, Mr Chenri Hui, Ms Jane Huiling Lin and Mrs Jocelyn Sara Lim; and also to our excellent colleague from the Office of Education Research (Publishing Team) Mr Jarrod Tam for his copyediting and close proofreading work. It is therefore my absolute pleasure to present to you the fifth issue of the *CJ Koh Professorial Lecture Series*—"Rethinking Educational Paradigms: Moving from Good to Great".

**Associate Professor Ee Ling Low**
**Head, Academic Quality Management, NIE**
**Series Editor, *CJ Koh Professorial Lecture Series***
**January 2014**
**Singapore**

# ABOUT THE CJ KOH PROFESSOR LINDA DARLING-HAMMOND

**PROFESSOR LINDA DARLING-HAMMOND'S** name is almost synonymous with research on teacher education on the global stage. She is currently the Charles E. Ducommun Professor of Education at Stanford University. She founded and oversees the School Redesign Network, established in 2000, which has taken a national leadership role in the arenas of school and district reform, leadership development, and the support of powerful and equitable curriculum and assessment. She also founded and co-directs the Stanford Center for Opportunity Policy in Education (SCOPE), established in 2008, which fosters research, policy and practice strategies for educational quality and equality. She serves as an adviser to President Barack Obama on education reform and led his education policy transition team in 2008–2009.

Professor Darling-Hammond's research and policy work have focused on issues of school reform, teaching quality and educational equity at the federal, state and local levels. Beginning with her work as Senior Social Scientist and Director of the RAND Corporation's Education policy programme, and through other appointments at Columbia's Teachers College and Stanford, she has conducted research on a wide range of policy issues affecting teaching and schooling while advising policymakers at all levels of government. She has led the development of new standards and assessments for students and teachers, launched innovative schools, redesigned teacher training programmes, and designed policies that have supported greater opportunities for children and youth.

From 1994–2001, she served as Executive Director of the National Commission on Teaching and America's Future, a blue-ribbon panel chaired by Governor James B. Hunt. The 1996 report, *What Matters Most: Teaching for America's Future*, led to sweeping policy changes affecting teaching and schooling. The Commission developed state and local partnerships in


more than 25 states to promote legislative changes and organisational reforms. In 2006, this report was named one of the most influential affecting U.S. education and Professor Darling-Hammond was named one of the nation's 10 most influential people affecting educational policy over the last decade.

As the William F. Russell Professor at Teachers College, she co-founded the National Center for Restructuring Education, Schools and Teaching (NCREST), which supported a range of school reform

# ABOUT THE CJ KOH PROFESSOR LINDA DARLING-HAMMOND

initiatives nationally. Professor Darling-Hammond has been deeply engaged in efforts to redesign schools so that they focus more effectively on learning and to develop standards for teaching. As Chair of New York State's Council on Curriculum and Assessment in the early 1990s, she helped fashion a comprehensive school reform plan for the state that developed new learning standards and curriculum frameworks for more challenging learning goals and more performance-oriented assessments. This led to an overhaul of the State Regents examinations as well as innovations in school-based performance assessments and investments in new approaches to professional development.

As Chair of the Model Standards Committee of the Chief State School Officers' Interstate New Teacher Assessment and Support Consortium (INTASC), she led the development of licensing standards for beginning teachers that reflect current knowledge about what teachers need to know when teaching challenging content to diverse learners. These were ultimately incorporated into the licensing standards of more than 40 states and became the foundation for a new generation of teacher certification tests. She has further been instrumental in developing performance assessments that allow teachers to demonstrate their classroom teaching skills in authentic ways, as an early Board Member of the National Board for Professional Teaching Standards and later as a Co-Founder of the Performance Assessment for California Teachers.

Professor Darling-Hammond has been active in developing innovative schools. She began her career as a public school teacher and has co-founded both a preschool/day care centre and a charter public high school serving low-income students of colour in East Palo Alto. In a community where only a third of students were graduating and almost none were going on to college, the East Palo Alto Academy High School—an open admissions school which admits students by lottery—has created a pipeline to colleges for more than 90 of its graduates. The school, along with seven others, is a professional development school partner with the Stanford Teacher Education Program (STEP), which prepares a leadership corps of teachers for high-needs schools. She led the redesign of STEP for this new mission, and its successes have been acknowledged in several studies as one of the nation's top programmes.

She has worked with dozens of schools and districts around the nation on studying, developing and scaling up new model schools—as well as preparation programmes for teachers and leaders—that enable much greater success for diverse students. She has also worked with civil rights and community-based organisations to leverage changes in state and local level policies and to create practices that promote greater equity in educational opportunity and access for traditionally underserved students. For this work, she has been awarded, among others, the Charles W. Eliot Award for Outstanding Contributions to Education, the Asa G. Hilliard Award for Outstanding Achievement in Racial Justice and Education Equity, the Founder's Award from the National Commission on African American Education, the Woman of Valor Award from Educational Equity Concepts, and the Distinguished Service Award from the Council of Chief State School Officers.

Professor Darling-Hammond is a past President of the American Educational Research Association, a two-term Member of the National Board for Professional Teaching Standards, and a Member of the National Academy of Education, for which she still serves on the executive committee. She has served on many national advisory boards, including the White House Advisory Panel's Resource Group for the National Education Goals, the National Academy's Panel on the Future of Educational Research, the Academy's

# ABOUT THE CJ KOH PROFESSOR LINDA DARLING-HAMMOND

Committee on Teacher Education, and on the boards of directors for the Carnegie Foundation for the Advancement of Teaching, the Spencer Foundation, the Wallace Foundation, the National Foundation for the Improvement of Education, the Center for Teaching Quality, the Alliance for Excellent Education, and the National Council for Educating Black Children.

She is author and editor of 16 books and more than 300 journal articles, book chapters and monographs on issues of policy and practice. Among her books are *The Flat World and Education: How America's Commitment to Equity Will Determine Our Future* (Teachers College Press, 2010); *Powerful Teacher Education: Lessons from Exemplary Programs* (Jossey-Bass, 2006); *Preparing Teachers for a Changing World: What Teachers Should Learn and Be Able to Do* (with John Bransford; Jossey-Bass, 2005), which is a winner of the AACTE Pomeroy Award; *Teaching as the Learning Profession* (co-edited with Gary Sykes; Jossey-Bass, 1999), which received the National Staff Development Council's Outstanding Book Award for 2000; and *The Right to Learn* (Jossey-Bass, 1st edition, 1997), recipient of the American Educational Research Association's Outstanding Book Award for 1998.

Professor Darling-Hammond holds honorary degrees from many universities in the US and abroad including Nanyang Technological University's first honorary doctorate in Education and has received numerous awards for her research contributions, including the Council of Scientific Society of Presidents' Education Research Award; the American Educational Research Association's Awards for Distinguished Contributions to Research, Research into Practice, and Review of Educational Research; and the Margaret B. Lindsay Award for Distinguished Research in Teacher Education.

# ABOUT THE ROUNDTABLE PANELISTS

**Ms Adora Svitak** has been exploring what she can do with the written word since the age of 4: everything from championing literacy and youth voice to raising awareness about world hunger. Hoping to instill her love of learning in other children, she taught her first class at a local elementary school the year her first book, *Flying Fingers*, debuted. Since then, she has spoken and taught at hundreds of schools, classrooms and conferences around the world. She co-authored her second book, *Dancing Fingers*—a collection of poetry—with her older sister Adrianna in 2009. She has published three books since age 7. At 12, she delivered the speech "What Adults Can Learn from Kids" at the prestigious TED conference. That video received over two million views and has been translated into over 40 different languages. Since 2010, she has organized the entirely youth-run TEDxRedmond conference, which hosts over 700 attendees every year. She writes for *Huffington Post*, *Mashable* and various publications on education and youth culture. She worked with Google to create an innovative video series called *Teach Teachers Tech* to encourage and inspire educators to further integrate technology tools in the classrooms.

**Professor Bonnie Cramond** is a Professor and the Director of the Torrance Center for Creativity and Talent Development. She has been a member of the Board of Directors for the National Association for Gifted Children and the editor of the *Journal of Secondary Gifted Education*. She teaches graduate classes in giftedness and creativity. Her research interests center around the assessment and development of creativity, particularly the identification and nurturance of creativity among students considered at risk because of their different way of thinking, such as those misdiagnosed with ADHD, emotional problems, and those who drop out of school. Professor Cramond has been a national and international speaker, and is currently working with educators in Turkey, Portugal, Japan, China, Abu Dhabi and India on infusing creativity into the schools. She is a co-editor of *Investigating Creativity in Youth*, and has authored many chapters and articles on giftedness and creativity. A former teacher, she is a survivor of parenting two gifted/creative individuals.

# ABOUT THE ROUNDTABLE PANELISTS

**Professor Deanna Kuhn** is professor of psychology and education at Teachers College, Columbia University. She was previously a faculty member at Harvard University's Graduate School of Education. Her Ph.D is from University of California, Berkeley in developmental psychology. She is editor of the journal *Cognitive Development*, previous editor of the journal *Human Development*, and co-editor of the last two editions of the cognition volume of the *Handbook of Child Psychology*. She has published widely in psychology and education journals ranging from *Psychological Review* to H*arvard Educational Review*. She has written three major books, *The Development of Scientific Thinking Skills*, *The Skills of Argument*, and, most recently, *Education for Thinking*. Her current work is devoted to designing and evaluating curricula to develop inquiry and argument skills in young adolescents.

**Professor Neil Mercer** is Professor of Education at the University of Cambridge, where he is also Chair of the Psychology and Education Group and Vice-President of the college Hughes Hall. Previously, he was Professor of Language and Communications at the Open University. He is a psychologist with particular interests in the development of children's language and reasoning, classroom talk and the application of digital technology in schools. His research with colleagues generated the Thinking Together practical approach to classroom pedagogy, and he has worked extensively with teachers, researchers and educational policymakers on improving talk for learning in schools. Formerly editor of the journals *Learning and Instruction* and *International Journal of Educational Research*, he is now an editor of *Learning, Culture and Social Interaction*. His most recent books are *Exploring Talk in School* (with Steve Hodgkinson) and *Dialogue and the Development of Children's Thinking* (with Karen Littleton).

# ABOUT THE ROUNDTABLE FACILITATOR

**Associate Professor Manu Kapur** is Head of the Learning Sciences Lab at NIE and is an Associate Professor in the Curriculum, Teaching and Learning Academic Group. He conceptualised the notion of Productive Failure and used it to explore the hidden efficacies in the seemingly failed effort of small groups solving ill-structured problems collaboratively in an online environment. His current research extends this line of work across the modalities of classroom settings in Singapore. An engineer by Bachelors training, Manu was a pre-university Mathematics teacher for 5 years before receiving his doctorate in instructional technology and media from Teachers College, Columbia University in New York, where he also completed a Master of Science in Applied Statistics. He also has a Master of Education from NIE.

# TEACHING FOR DEEPER LEARNING:
## DEVELOPING A THINKING PEDAGOGY

**PROFESSOR LINDA DARLING-HAMMOND**

**5 JUNE 2013, KEYNOTE SPEECH AT THE 2013 REDESIGNING PEDAGOGY CONFERENCE, NIE, SINGAPORE**


*The following article is based on Professor Linda Darling-Hammond's keynote speech presented at the 2013 Redesigning Pedagogy Conference held at NIE, a biennial conference attended by local and international teachers, school leaders, education policymakers and education researchers.*

**Introduction**

**IN HER PRESENTATION** entitled "Teaching for Deeper Learning: Developing a Thinking Pedagogy", Professor Linda Darling-Hammond introduced "thinking pedagogy" from the perspective of what the US is currently calling "deeper learning". Thinking pedagogy as a goal in education is becoming increasingly more prominent. This would require rethinking of what is required in both the classroom and the policy environment to support teaching for deeper learning.

**Schools and the Knowledge Explosion**

Schools have been changing throughout the ages. The goal of schooling in the Medieval Age, in many countries, was to communicate religious teachings. In the Industrial Age, the goal was to educate for discipline, for following set patterns and routines, and for doing that compliantly and obediently. Now, in the current age, the goal of schooling is to provide students the skills and knowledge they will need to be successful in 21st century society, work and civic life. Hence, the challenge is to create motivated and self-reliant citizens and risk-taking entrepreneurs. Professions are also continuously emerging because knowledge is always

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changing, tied to the changing global economy and society (Schleicher, 2009).

Between the years 1999 and 2003, there was more knowledge created in the world than the entire history of the world preceding; and during that time, technology knowledge doubled every 2 years. Now, it is doubling every year. So it is inconceivable to continue seeing the curriculum as a set of facts that are identified and divided into the 10 or 12 years of schooling, administered to the students and transmitted as information. All the while we are expecting children to be ready when they graduate.

Due to the quantum leap of knowledge being created, schools have to prepare students to go into the world where they have to use knowledge that has not been invented yet and technologies that have not been discovered yet to solve problems that cannot be fully appreciated at this time. Therefore, this is an entirely different educational challenge as compared to the last century. This is also revealed in the changes and expectations for jobs and skills required in the job market.

As pointed out by Levy and Murnane (2005), there has been a steep increase in the expectations for complex thinking and communications, and a decline in the expectations for routine skills such as manual skills. Looking at the Fortune 500 companies in 1970, the top three most valued skills were reading, writing and arithmetic. But by the turn of the 20th century, the top three most valued skills were teamwork, problem solving and interpersonal skills, followed by oral communication (Cassel & Kolstad, 1999). With the changes in the demands of the economy and to tackle the challenges that are ahead, one needs to have the capacity to learn by oneself and to engage in deeper learning.

**What Is Deeper Learning?**

Deeper learning is not merely relaying accurate information, transmitting it from one person to another. It has to be effective for students to be able to completely understand it and use it in any other context. Teaching styles have to be transformed from a transmission approach to teaching through an approach that would help students to think critically and enable them to solve problems, communicate more effectively, work collaboratively and learn how to learn in this context where rigorous academic content is being imparted at the same time.

Deeper learning can be seen as:

- an understanding of the meaning and relevance of ideas to concrete problems;
- an ability to apply core concepts and modes of inquiry to complex real-world tasks;
- a capacity to transfer knowledge and skills to new situations, to build on and use them;
- abilities to communicate ideas and to collaborate in problem solving; and
- an ongoing ability to learn to learn.

**Developing Independent Learners to Meet the Challenges of the New Society**

One key element for thinking pedagogy is developing independent learners. It is necessary to move from students who are dependent on the teacher to those who are self-reliant and can make informed decisions about their own learning. These students are aware that they should not just be told what they know and graded by the teacher, but are able to reflect on their learning and work out what they know themselves. They should also become aware of their own strengths and weaknesses so that they can purposefully work on them, and at the same time, always connect classroom learning to the real world.

Taking responsibility for one's own learning and knowing about different strategies for learning are the most effective strategies to learn independently.

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Independent learners have a sense of their own profile and their own learning strategies and ways to actualise and effectuate learning. They plan their learning and set goals, are intrinsically motivated by making progress in their learning rather than only being motivated by extrinsic motivators such as grades or rewards, and reflect on their learning process and progress forward in their continued learning journeys.

In the processes of teaching, there are 10 features that are particularly useful and important in helping to develop thinking and independent students.

***Creating complex, authentic tasks worth doing***

Tasks that students undertake need to be complex enough to enable them to plan and organise themselves. Tasks also need to be authentic and will require students to look at what happens in the world outside school. This will motivate students to undertake these tasks and figure out how the knowledge is applied. Students will also be able to learn transfer skills that they are going to need because work outside of school is vastly different from what is carried out in school.

***Planning for choice and inquiry***

Students do not always need choices for everything. Obviously, schools have a curriculum and have ideas on how to help students accomplish tasks and understand content. But with any task, there are always choices to be made and a need to think judiciously about which choice allows for student motivation and therefore learning to go on. Although there is a valid concern that when teachers are going deeply into performance tasks, there is no time to cover much of anything else. However, with students choosing different aspects of the problem to research, they can share their research and learning with each other to see the bigger picture of why they are learning and what they are learning.

***Connecting tasks to authentic assessments***

There is a need to connect tasks to authentic assessments that reflect the way in which it can be applied in the real world and where students can evaluate their own progress.

***Building effective scaffolding that supports competence, confidence and motivation***

When work becomes very challenging for students, are they going to stay with it and continue or are they going to give up and become unmotivated? There needs to be a way where they can learn that with additional reflection and effort, where they can grow more confident. How can this be done? Part of how to do this is what she terms as the “pedagogy of revision and redemption”.

From research on formative assessment, one of the most powerful things a teacher can do is to give students feedback on their work and an immediate opportunity to revise that work. This allows students to see that with their revision (e.g., retaking a Mathematics test and with the additional guidance, feedback and study), they can make more progress. When there is a pedagogy in which revision is continuous and students aim to be competent at what they are doing, achievement gaps will narrow and the overall level of achievement will increase.

***Supporting self-assessment and peer-assessment and revision***

Having students involved in self-assessment (evaluating their own work with the rubrics and criteria) and peer-assessment (evaluating each other’s work) can help students become aware of what is asked of them. What we ultimately want is for students to carry that standard of quality with them, and not to rely on teachers to tell them if they are any good, but to know how to evaluate their own work using an assessment criterion.

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***Building reflection and extension into learning***

Professor Darling-Hammond visited a class engaged in Science investigation during a visit to a Singapore elementary school some years ago. A particular Grade 4 or 5 student was showing her the investigation that his group had undertaken about the design of airplane blades. They were in the process changing the design and testing it out. At the end of the investigation, they were not only able to present the conclusion they drew but were also able to share the hypothesis for their next level of investigation. The teacher also gave them that opportunity to be able to engage in that extension of their learning. So it was not just a hypothetical extension but students were truly able to take an idea and pursue it until they got to a very sophisticated level of understanding via hunting for empirical evidence.

***Enabling collaboration and peer learning***

Having students learn to collaborate and learn from each other will help build teamwork and collaborative skills that are becoming increasingly important for functioning effectively in the global workplace and society.

***Developing social-emotional skills***

For students to be able to be both resilient in the face of rigorous challenges and to be able to work collaboratively, they need to develop social and emotional skills such as the ability to know and manage their own emotions, to interact better with others and empathise with them, and to be able to see the effects of one's actions on the community. Those non-cognitive skills are just as important for ensuring success in life as the mastery of cognitive skills.

***Identifying strengths, learning styles and goals with students***

Identifying together with students their strengths, learning styles and goals are key elements in assisting them to realise their potential and to deepen their knowledge of self.

***Supporting student decision-making, social responsibility and leadership***

In one classroom in the United States, a teacher has transformed a series of English Journalism classes from what it was traditionally to what it is now, where the students end up running the class, developing a newspaper which is award-winning and is one of the top-rated student products in the competitions in the US, and where the evidence shows their reading and writing skills improve more rapidly in this course than in a teacher-centred course. Authentic tasks that are well-scaffolded with a lot of learning about writing process—the grammatical issues, the aspect of developing journalistic style, the social-emotional support—is evident in this course. Usually these tasks are left for after school as the extra curriculum. However, when it is carefully fitted within the curriculum space, students can, in fact, learn in ways that exceed their own expectations and are able to develop this higher-order thinking and out-perform their own expectations of self.

**The Need for Assessment Reform**

There are obstacles to these approaches for deeper learning: students' own expectations; parents' expectations of what school should be like; curriculum design; and educators' expectations and skills. Now in the world, there is more and more emphasis being put on helping students demonstrate mastery through tests. Many countries are being compared through the Programme for International Student Assessment (PISA) examinations and on the Trends in International Mathematics and Science Study (TIMSS) examinations. These tests have the inevitable consequence of determining the curricula of study in the different systems that take part in them. How can the reformation of assessment and the tasks that are used in the classroom be done so

that they support the kind of deeper learning that is required?

According to Chris Wardlaw's "Mathematics in Hong Kong/China—Improving on Being First in PISA" (2006), the points below are the list of new expectations for learning:

- ability to communicate
- adaptability to change
- ability to work in teams
- preparedness to solve problems
- ability to analyse and conceptualise
- ability to reflect on and improve performance
- ability to manage oneself
- ability to create, innovate and criticise
- ability to engage in learning new things at all times
- ability to cross specialist borders

Assessments should reflect these points. Otherwise, teachers will be encouraged to transmit information simply for rote memorisation. An example of the kind of assessment that brings about the abilities and attributes of the above list is the project work requirement in the "A"-Levels in Singapore. The "A"-Levels assessment is an interdisciplinary assessment that allows a group of students to identify a question, pursue it collaboratively, present it individually, and as a group keep track of how well they collaborate and work in collectively solving the problem (Singapore Examinations and Assessment Board, 2013). That is really what employers are asking for from schools. Now this only appears in the examinations at the very end of the educational process for a subset of students and it will be ideal to scale it up system-wide not just for Singapore but internationally.

Part of the question for teachers is how they should plan this kind of work throughout the curriculum for all kids and all contexts so that the development of thinking skills is happening from the very beginning. The development of thinking skills does not have to wait until basic skills have been mastered.

**Conclusion**

There is a need to think about a couple of issues as a thinking pedagogy is being developed. How can assessments that are models of good instruction be developed in classroom work as well as in policy work to exemplify quality work and standards? These can be used to help students see what quality work is and to revise their work to meet a standard that can be diagnostically helpful in seeing how students think as well as in informing us about what they know.

We have to consider the availability of the tools for teacher learning and the basis for professional development. If we can get to a place where assessment is used of, as and for learning, we can advance the cause of a thinking curriculum for all students. Ultimately, nations need to think about how to create an accountability system that supports learning.

Ted Sizer (2004), a noted educator in the United States, stated that the goal of education is for students to "learn to use their minds well" and to be able to apply what they know in the world beyond school. We should use that as the lens for every curriculum design we undertake, every test we create, every activity we do, every assessment that we use. Teachers should ask the question, "Can my curriculum help students learn to use their minds well and apply what they know to their world beyond school?"

Every test we get back from students ought to help us learn about their learning, help the school learn about learning and help in the continual improvement of teaching. It should help the education ministries

learn about the development of the right curriculum and about the support needed. So at the end of the day, a thinking curriculum for all students is a reality. We have passed the point of history where we can think that only some students have the privilege and the need to learn to engage in learning to think and applying their knowledge.

John Dewey (1907) famously said, "What the best and wisest parent wants for his or her child, that must the community want for all of its children. Any other goal is narrow and unlovely; acted upon, it destroys our democracy" (p. 19). For those who are in societies looking to contribute to a world that must become more connected, more communal and more globally effective and empathetic, it is going to be important that we are able to develop education systems that put equity needs of our whole population right there with the needs that we have for our children's thinking, creativity and capacity to be the problem solvers that we need them to be in the complex world that we live in today.

**References**

Cassel, R. N., & Kolstad, R. (1999). The critical job-skills requirements for the 21st century: Living and working with people. *Journal of Instructional Psychology, 25*(3), 176–180.

Dewey, J. (1907). *The school and society: Being three lectures by John Dewey*. Chicago, IL: University of Chicago Press.

Levy, F., & Murnane, R. J. (2005). *The new division of labor: How computers are creating the next job market*. Princeton, NJ: Princeton University Press.

Schleicher, A. (2009, July). *Benchmarking international best practice*. Paper presented at the meeting of the Putting the World into World-class Education Asia Society, Washington, USA.

Singapore Examinations and Assessment Board. (2013). *GCE A-level project work syllabus examined in 2013*. Retrieved from http://www.seab.gov.sg/aLevel/2013Syllabus/8809_2013.pdf

Sizer, T. R. (2004). *Horace's compromise: The dilemma of the American high school*. New York, NY: Mariner Books.

Wardlaw, C. (2006, September). *Mathematics in Hong Kong/China—Improving on Being First in PISA*. Paper presented at the 50th Annual Meeting of the Australian Mathematical Society, MacQuarie University, Sydney, Australia.

# NURTURING CREATIVITY AND INNOVATION IN EDUCATION SYSTEM

**5 JUNE 2013, ROUNDTABLE DISCUSSION, NIE, SINGAPORE**


**Introduction**

**THE ROUNDTABLE DISCUSSION** on "Nurturing Creativity and Innovation in Education System" was attended by Professor Linda Darling-Hammond, academics, school leaders, researchers and MOE officials. The main discussions focused on harnessing students' and teachers' creativity. Before arranging the participants into five groups, roundtable facilitator Associate Professor Manu Kapur asked three of the five keynote speakers from the 2013 Redesigning Pedagogy Conference, Ms Adora Svitak and Professors Neil Mercer and Bonnie Cramond, to comment on any of the following statements prepared. Professors Linda Darling-Hammond and Deanna Kuhn then closed the session by giving their thoughts on the roundtable issue.

The statements were:

- Students learn quickly that compliance is rewarded more than creativity and innovation.
- Creativity is nature, not nurture.
- Creativity is too subjective to assess.
- Classroom practices may inhibit creativity.
- There is no time for creativity.
- Only creative individuals can develop creativity in others.

What follows next is an attempt to summarise the main responses from the different keynote speakers in their own words.

# NURTURING CREATIVITY AND INNOVATION IN EDUCATION SYSTEM

5 JUNE 2013, ROUNDTABLE DISCUSSION, NIE, SINGAPORE

**Opening Comments**

**Neil Mercer:** I agree and disagree on the statement "Creativity is nature, not nurture". I think it is human nature to be creative. I think it is often the case in the human environment to be creative. I also think that, like most human attributes, we are born with the capability and potentiality to be creative. But it is only through nurturing that that capability will be developed.

What I have seen in the conference are ways that teachers can be more actively nurturing to the potential to be creative. I think it is important for teachers to realise that it does not mean that they should just leave students alone. There is no virtue in reinventing the wheel when generations have spent a long time making them work. What you have to do is give them a position whereby they can improve those wheels and seriously criticise what's there. My position is, yes, we are naturally creative but it's only through nurturing creativity that we'll be able to ensure that the potential is realised.

**Adora Svitak:** I find the statement "Classroom practices may inhibit creativity" interesting because I have seen examples where what teachers say may make students think they have to be less creative. One particular example is about a friend of mine who is in an art class and they were told to use contrasting colours and not doing so will mean getting a B- instead of an A+. She looked at the painting and said, "Hey, I don't think it works best with contrasting colours, I might just go ahead and get the B-." But in situations where grades are all important it goes down to the amount of creativity that can be enabled.

Second thing is when creative pursuits are treated as less than, for example, Science, Technology, Engineering and Math (STEM) topics. Not that there is no creativity in the STEM topics, definitely scientists are some of the most creative people in the world. Too often we think of creativity as just art projects or dioramas when truly we have to expand creativity beyond art pieces being presented in the classrooms. We really need opportunities to have less partition, less grading, and more sharing and collaboration.

**Bonnie Cramond**: When I started writing on creativity, I was the odd one out. These days, research on creativity is becoming more mainstream. One comment that I hear a lot when I work with teachers is that only creative teachers can inculcate creativity in others. And so many teachers would tell me, "Oh, but I am not creative." But the group of teachers I have talked to at the Redesigning Pedagogy Conference, where the theme of the conference was on "Thinking", were different. Nobody said, "I have no intelligence." We all have talents that we can nurture and improve on, and we all have creativity that we can nurture and improve on. You don't have to be the most creative person to bring out creativity in others. For example, in sports, some of the best coaches were not themselves the best athletes. But they know how to bring out the talent and potential in others.

**Sharing of the Small-group Discussions**

***Group 1***

The group talked about knowing that there are creative attributes and creative dispositions, and relating creativity very much to resilience and persistence. The group also talked about creativity being in a binary opposition to something else. Creativity is associated with nurturing, not memorisation, and it requires deep disciplinary knowledge; for example, a doctor who is performing a surgery can use the skills learned in university in new creative ways to ensure a patient receives the best results. In school, it is recognised that it is not just about students' learning or a particular instructional materials, but a need for a repertoire of assessment modalities consisting of a range of instructional modalities.

***Group 2***

The group discussed the importance of having a common understanding of creativity within the teaching fraternity. One of the major barriers in creating a culture of creative teaching is the fear of uncertainties that may arise from teaching creatively and teaching creativity. The group suggested that for creativity to be taken up by teachers, there must be a strong purpose for teaching creativity, and this has to be backed by a change in key performance indicators which are used to measure teachers' performance. The group also deliberated over the milestone shifts at a system-wide level. These include (1) valuing creativity, (2) respecting individual responses, (3) listening to learners, and (4) design thinking which is to find solutions to problems existing in the community and learning from failure.

***Group 3***

The group talked about how the social construct of knowledge needs time and space to develop. Teachers need the skill sets and dispositions to accept creative ideas within the classroom setup. However, creating time and space is not sufficient. For example, in Singapore where curriculum, pedagogy and assessment are core pillars, it is important to come up with creative solutions for problems. To achieve this, more structured and innovative ideas on the part of the teacher are needed. Therefore, it is paramount for teachers to be trained to facilitate knowledge and to teach thinking skills.

***Group 4***

The group discussed how the value of creativity lies in its originality and sense of ownership. Since creativity is broad and interdisciplinary, assessing it poses some challenges: (1) the competency of teachers to assess,(2) the involvement of imposition, (3) how to push the boundaries of assessment so that its limitations are minimised, and (4) how to distinguish between the different definitions of assessment.

***Group 5***

Creativity is a mind-set that is not bound by a product or outcome at the end. It starts with a creative mind and mind-set by experimenting and trying new things. For creativity to have value, group productivity must be encouraged where dissenting voices sometimes create more creative ideas. On the other hand, teachers fear the experimentation even if management allows failure. Therefore, it is important to support teachers so that they will be bold in experimenting with new ideas and innovations.

**Closing Thoughts**

**Linda Darling-Hammond:** I am not a scholar of creativity so I will stay out from creativity scholarly works but instead talk about teaching. I want to talk about the distinction between creativity with a big "C" and creativity with a small "c".

When we think about what we mean by creativity, one definition has to do with originality. We have a fruitful discussion about originality—original to the person or original to the world. But the ownership piece I want to talk about is when a student is given an opportunity to create something, they take ownership of that knowledge. In a sense we can ask: Is creativity a thing, a noun, quality or outcome? That's creativity with a big "C". Is it a process, pedagogy, a verb or an adverb?

To create is an act that a person goes through that allows them to build the capacity to do things, to solve problems, to think flexibly, to do something, to observe the results carefully, reflect on the results and to adapt accordingly. Then there is the pedagogy of doing that allows children to do things with their knowledge, to create things—whether it develops creativity with a big "C" or not, I am not sure. Hundreds of studies show that when kids apply their knowledge in which they create something and apply basic skills, they have learned more deeply by being engaged in the pedagogy of

creation. I would suggest that they are likely to develop creativity in other ways, at least in the kind of creativity that allows them to be problem-solvers and responsible thinkers to engage the world.

Somebody handed me today at the conference a wonderful work going on in Mexico about tutorial pedagogies where kids learn to teach something. The first sentence is a statement by Robert Fried, "If you believe that adults can make children learn well, in the absence/defiance of a child's inner sense of confident engagement with the power of discovery and mastery, then in my view you are placing that child in a great risk of failure as a learner." The inner sense of confident engagement with the power of discovery and mastery is actually what you get by being engaged in a creative process in any field.

One thing we may think about is the way teachers work in which students are given the opportunity to do things creatively. In that context, in between creating something original, learning skills about observing and reflecting, trying, experimenting, you also have some sort of disciplined creativity. You are bringing disciplinary approaches to do things which include creating with some standards and constraints but which also allows some personal originality and flair to be demonstrated.

I think that there is another piece of the puzzle we need to think about where there is a lot of active creating in a school space. We can also think about how to develop and encourage it. Constraints can be really good. Some say creativity should exist without being constrained but actually a lot of creative work happens when there are constraints. If we think about the pedagogy on this, Professor Lin Goodwin said, "Good teaching is intrinsically creative." This is partly because you are operating within the constraints. You want to help kids achieve the disciplinary inquiry, you want them to have the opportunity to try things themselves but also want them to learn the system of math. You are operating within the constraints, you are trying to figure out what kids know, how to manage the emotional, cognitive, the creative curriculum piece. I think the challenge for teachers first, aside from "teaching creativity" is to teach in a way that enables kids to create the pedagogical solutions that they need in order to move forward in ways that help them to be thoughtful and disciplined, and to maintain originality.

**Deanna Kuhn**: I want to make two points. One is a claim, one is evidence based, which I value highly and devoted my life to. Let me start with the evidence which is a study we did recently where we asked middle-school kids to do this writing assignment: You are the new headmaster of a new high school that prepares students for the 21st century. You have the freedom to design the curriculum, so write a letter for prospective parents of students laying out what students will study and how it will prepare them for the future. Students were actually creative with this assignment. A few of them fantasised about locker rooms with Jacuzzis, but what was more interesting was that out of the diversity of New York City disadvantaged middle-school kids, there were two responses that were very common.

One was some choice on the students' part on what they would study and the other was time during the day to devote to it. A six-grader, for example, said, "You should send your child to our school because it is so wonderful. Students have put in learning goals for people whose interests are very much like their own. Because of this curriculum, students realise their interests, which helps later when they begin their careers. We help students reach their goals. We are here to pursue their dreams. A student of ours pointed out that adults make almost all their choices for themselves. Hence, one of our main goals is to incorporate personal choice into our school." A very

creative idea from a 12 year old. I think we need to take that kind of response from students very seriously and clearly the place for thinking about creativity is in that space.

Secondly, I have been studying everything I can find to learn about Singapore's school system and I read this week that you have the British "A"-Levels examinations. In the General Paper exam, students are expected to construct an argument supported by evidence and co-ordinate multiple perspectives. When and where do you teach those skills? The one thing I can tell you as a developmental psychologist, who has spent a couple of decades now studying exactly those skills, is that they do not develop naturally. Students need dedicated attention and what teachers need is some kind of a mental model of a developmental trajectory and what we know thus far about the mechanism is that it is engagement and practice that propels movement along that trajectory. I would claim that the same is true of creative/innovative thinking with a small "c" but we do not know much about the trajectory as we do about argumentative reasoning but that mechanism is probably going to be the same thing that we will need when engaging students in rich opportunities in order to exercise the kind of thinking that gives space for innovation.

Finally, we then as educators need to have the commitment that it is important enough that we are going to make the space and time for it in the curriculum in the face of all other competing pressures.

# IMPROVING LEARNING:
## WHAT CAN WE LEARN FROM REFORMS AROUND THE WORLD?

PROFESSOR LINDA DARLING-HAMMOND

6 JUNE 2013, PUBLIC LECTURE, MOE, SINGAPORE


**Introduction**

**THERE IS AN** active agenda for educational reform worldwide, due to the pressures for school change arising from social changes. For example, in the U.S. knowledge-based economy, jobs that require specialised knowledge and skills have increased from 5% in 1900 to 70% in 2000. Accordingly, many societies are trying to rethink their education systems: transforming education systems designed to educate a small number of people for knowledge work into systems capable of educating most people at a much higher level.

Moreover, the changing nature of knowledge makes it outmoded to master a fixed body of facts. Education systems need to help young people to learn to learn so that they can meet the increasing demand for interactive, non-routine analytic skills in the workplace. This poses a dilemma for schools as the skills that are easiest to teach and test are also the ones that are easiest to digitise, automate and outsource. Therefore, schools are facing the pressure to reconceptualise the curriculum, learning strategies and outcomes.

The need to reform education is also rooted in the aims of education. We need to prepare the young people to envision and create a world in which people have employment, food and shelter, and clean water. They will need to figure out how to sustain in a time of global warming and other environmental changes, to resolve conflicts and nurture peaceful collaboration, and to develop all kinds of new products, solutions and

strategies for living and learning. All these are going to require critical thinking and creativity.

This lecture will focus on the following factors which are closely associated to achieving these education goals:

- societal supports for children's welfare, including early childhood education;
- substantial investments in initial teacher education and ongoing support;
- schools designed to support teacher and student learning;
- equitable resources with greater investments in high-needs schools and students;
- equitable access to a rich, thinking curriculum; and
- performance assessments focused on higher-order skills.

**Early Childhood Education**

High-education performers combine quality with equity, with less influence of socioeconomic status (SES) on achievements (OECD, 2012). One of the keys to address the influence of SES is Early Childhood Education (ECE). Analysis of PISA 2009 results indicated that in many OECD countries students who had ECE for more than a year had fairly noticeable performance advantage than those who did not. Because of its emphasis on ECE, Singapore ranks the second highest place in terms of the performance difference.

In many contexts, the quality of ECE closes much of the achievement gap and has long-term benefits for students such as promotion in school, graduation, college entrance and employment. The successful ECE programmes in New Jersey has cut the achievement gap by half and New Jersey became one of the top-performing states in all subject areas within 10 years. Evidence shows that a huge part of its success is due to the investment in ECE. Finland is another place where people get high-quality early childhood support. It begins before birth with universal pre-natal care and follows with health supports after birth. All parents can enjoy paternity and maternity leave with salaries paid. Teachers and early childhood workers were trained to work effectively with children of special needs and later in the schools as a continuum to the child-centred, development-focused experiences.

It has been found that the most successful ECE programmes have relied on the following interlocking elements:

- highly qualified teachers with a Bachelor's or Master's degree in early childhood education;
- small class-sizes;
- rich hands-on learning materials;
- language-rich and print-rich environments;
- creative play and engaging, collaborative learning activities; and
- parent outreach and education.

In these kinds of settings, children could very rapidly pick up the kind of vocabulary and the kind of hands-on experiences that allows them to engage in active learning activities later.

Research has highlighted the significance of teacher training for high-quality ECE. Teachers with a Bachelor's degree and ECE training are more effective and "provide care that is warmer and more sensitive to children's needs and are able to create a more stimulating and language-rich learning environment" (Zigler, Gilliam, & Jones, 2006, p. 110).

**Developing Teachers**

Research around the world has demonstrated that effective teachers are able to:

- engage learners in active learning;
- create intellectually ambitious tasks;
- use a variety of teaching strategies;

- assess student learning continuously and adapt teaching to student needs;
- create effective scaffolds and supports;
- provide clear standards, constant feedback and opportunities for revising work; and
- develop and effectively manage a collaborative classroom in which all students have membership.

Teacher effectiveness has many components. In the U.S. context, research shows that students' learning gains are related to teachers' strong academic background, quality preparation prior to entry teaching, certification in the field they teach, their experience of teaching, and certification from the National Board.

Therefore, education policies should strive to strengthen and equalise these features. One example that is worth our attention is the work on teacher performance assessments by the National Board for Professional Teaching Standards (NBPTS), and others in the United States. These innovations not only create the means for examining teaching that are related to effectiveness and that promote candidate learning, but also provide useful information for informing preparation, professional development and practice.

**Developing High-quality Teaching: Policy Strategies in Melbourne, Singapore and Toronto**

Research conducted by the Asia Society Global Cities Network on the development of high-quality teaching strategies in cities such as Melbourne, Singapore and Toronto revealed a number of innovative strategies that are of great importance in improving and ensuring the quality of teaching.

***A Systemic Approach***

All of the cities use a systemic approach—connecting recruitment, selection, induction, mentoring, professional development, performance management, compensation and performance assessment around performance competencies.

For example, Singapore organises the development of teachers around the professional standards such as the Graduand Teacher Competencies at the National Institute of Education (NIE). The study also recognised NIE for its very comprehensive approach to quality management. The Office of Academic Quality Management (OAQM) was established to collect evidence about each of the elements of the teacher education system and continually provide feedback information about what is working, how it is working, where it is not working and what needs to be done about it. Another important and unique strategy in Singapore is the provision of three career tracks for developing talent in a very systematic way, namely, the Teaching Track, Leadership Track and Senior Leadership Track. In addition, the Singapore Government makes a deliberate attempt to identify talent and takes the responsibility of providing the learning opportunities to move people through the system. This is critical because talent development is ultimately at the heart of any significant system of education.

What we can learn from Ontario is their professional learning support for teachers from pre-service all the way to developing the teacher to become a leader. They have a coherent framework of teacher development programmes and resources implemented to support teachers in improving student development. All these programmes respect the principles of self-directed learning and are modelled on best instructional practices. They also reflect various stages, roles and profiles that teachers move through during their professional career. Ontario is also identifying the elements of effective school leadership and training principals to engage in courageous conversations

about race, class and stratification, about privileges and who gets access to what kind of learning opportunities. This constitutes part of the vision for leading the Ontario education system forward.

***Recruitment and Retention Factors***

Another area of the development of high-quality teaching is recruitment and retention. The the first, and critical, factor is the design of the teaching profession, which involves creating a positive culture with a strong sense of mission, offering good compensation and rewards, and providing opportunities for professional growth and learning. The second factor is having competitive and equitable salaries. The third factor is concerned with teacher education that is funded. It not only allows the profession to recruit the talented, but also allows people to receive the same amount of high-quality training. Lastly, induction support is very important for all of the systems to develop high-quality teaching.

***Intensive Teacher Preparation***

The three places are all moving toward increasingly intensive teacher preparation. One aspect is the trend towards more graduate level teacher education. For example, virtually all the teachers in Ontario are receiving a graduate-level education. Another trend is the move toward more intensive, collaborative clinical training in "teaching schools" in places like Melbourne and Toronto. In these places, teacher education has been modelled on the features of high-quality medical training. As in medicine, teachers need to see and enact good practice while they are studying so that they can connect research and theory with practice.

***Induction Influences Attrition and Competence***

Solid induction programmes characterise high-performing systems. High-quality induction has helped to reduce attrition and build professional competence. For instance, induction in Toronto takes 4 years and the city has less than 2% of attrition. Their highly successful induction programme includes:

- Ontario's New Teacher Induction Program, with supports such as orientation, mentoring and professional development in key areas (e.g., classroom management, parent outreach, assessment, special needs students);
- job-embedded learning initiative (in the 1st & 2nd years);
- job-associated mentoring (in the 3rd & 4th years);
- demonstration of classroom learning, which includes observations, debriefing, action planning and co-teaching; and
- professional learning for mentors.

**Inquiry-based Professional Learning**

Quality teaching is also influenced by the kinds of professional learning that teachers are engaged with. In Singapore, various attempts are being made to provide inquiry-based learning and collaborative networks for teachers by the Ministry of Education, Academy of Singapore Teachers and NIE. Every school is involved in inquiry-based professional learning communities, offering support for teachers to engage in lesson studies, action research and a variety of learning circles. Traditional professional development driven by a "spray and pray" approach has very limited effect on student achievement. By contrast, sustained inquiry about curriculum and teaching is going to make a difference as Singapore moves into the next era of a "student-centric, values-driven" education.

Elsewhere, in New York City, teachers get opportunities to look at learning in the classrooms of other teachers regularly, studying the teaching practices and student learning. A key feature of this approach is that teachers are learning about practice in practice from other expert teachers. It is done in a way that allows teachers to deeply capture the pedagogies that cannot be learned

by simply hearing about them. Teachers have to be at the place where teaching and learning is happening. They have the chance to touch and feel the activities and strategies as well as trying it out with children when the expert is around to give support and guidance. This approach propelled a particular school district in New York from one of the low-achieving districts to become one of the highest achieving.

**Policies to Achieve More Equitable Education Systems**

Many societies, including the US and Singapore, are working to achieve a more equitable education system. One strategy is to invest early in ECE, specifically, through to upper secondary. It involves making funding more responsive to educational needs such as providing sufficient resources to improve the quality of ECE and promote access, in particular, for disadvantaged families. It also involves taking into consideration that the instructional costs of disadvantaged students may be higher. In Ontario, low-income families, recent immigration, students with low-educated parents, and single parent groups are taken into account in the distribution of funds to school boards.

At upper secondary levels, it is important to design equivalent pathways that promote more work-oriented skills. Policy strategies should allow transition across different pathways, provide better information and guidance to students, and offer strong support for those at risk of dropping out. Singapore represents a good example in improving the quality of vocational tracks. In 1992, Singapore reviewed its Vocational Education (VE) and decided to transform and re-position VE so that it was not seen as a place of last resort. The result has been a doubling of enrolment, representing now about 25% of the post-secondary cohort. More than 82% of VE students in 2009 completed their training and were emplaced in the job market.

What are we learning from looking around the world? Innovative strategies that are underway in many societies to create a more equitable system of schools include:

- early childhood education investment;
- high-quality curriculum for all students;
- equitable and adequate resources;
- strong professional standards and support; and
- schools designed for empowering forms of student and teacher learning.

**Conclusion: A Look at Singapore**

For Singapore, two strategies might be essential to take the education system to the next level—from a system of good schools to a system of great schools. One is the investment in ECE. It is to ensure that during the years when the brain is absorbing everything it can, every child has the opportunities for early learning. This investment will make an enormous difference to equity because it will help close the achievement gap before school begins. It will also contribute to the overall capacity of the people to do the extraordinary work that this century demands, because people who learn a lot in a rich learning environment in early life are more capable, secure and confident people all the way through life.

The other strategy is that while Singapore is developing the "student centric, values-driven" approach to education, it would be crucial to identify young talents and develop their potential in a variety of ways. Education should not be constrained by a system of examinations, but expanded to a system of recognising and cultivating human potentials. Meanwhile, it is important to figure out how to build a multiple measuring system of the development of human talents. These might be some of the strategies that can move the Singapore education system from one that is good to great.

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**Question-and-Answer Session**

With Professor Wing On Lee as moderator, Professor Darling-Hammond engaged the audience in a question-and-answer session.


**Audience member 1**: Since the 1960s, the focus of educational discourse has shifted from social mobility and educational opportunities to quality and equity. The new idea about quality and equity gives us hope in that it combines the two fundamental aspects and brings learning closer to the students.

Improving quality is a very important way to solve the problem of inequality caused by SES. Recently, in high-performing systems such as Singapore and Hong Kong, there seems to be emerging and converging talk on learning quality. It has a lot to do with closing the achievement gap between high-achieving and the low-achieving students. Some common strategies are adopted among these countries. Another observation is that despite their accomplishments in internationally benchmarked tests like PIRLS and PISA, the high-performing systems do not celebrate or congratulate themselves. Instead, they engage in self-reflection and self-critique. I would also like to respond to your emphasis on ECE. Asian societies such as Singapore, Hong Kong and Macau are already putting extensive efforts into strengthening it. Your views?

**Professor Darling-Hammond**: Engaging in self-critique is almost true worldwide because we are focused on continually improving education given that it is seen as the ticket for the 21st century. Education is no longer something optional. Facing the extraordinary challenges in the modern world, almost all societies, including the high performers, are seriously working on improving education.

With respect to the comment about common strategies, what I noticed in common is their commitment to increasingly funding a basic level of education equitably for children. Another party is working hard to ensure that all the educators in the system are well prepared, are continually improving professionally, and are distributed equitably. When there are some schools that may be a little less desirable than others due to reasons such as geography or status, the governments will come up with incentives and strategies to ensure that all of the schools are adequately staffed. In most of these societies, there is investment in the common core curriculum at least in the early grades.

**Audience member 2**: I would like to add another dimension to the steep relationship between students' performance and SES factors in Singapore. Hiding behind the SES issue is the language complexity of the Singapore environment. Unlike Finland or Hong Kong, Singapore has a more complex home language environment. For example, more than 50% of students do not speak English as their most frequent home language but English is the language of instruction and the language of assessment for local examinations and international tests such as TIMSS and PISA. Research suggests a strong correlation between the students' language proficiency in English and their performance in Science and Mathematics. Therefore, Singaporean teachers are also working on the challenge of teaching students with different language backgrounds. For Singapore, ECE is an

important strategy that helps raise the literacy level of the students from different language backgrounds early in life.

**Professor Darling-Hammond**: I agree that early childhood is critical in developing language proficiency. This is because we learn languages extremely easily and quickly when we are very young. In addition, in early childhood we learn them primarily through immersion instead of formal instruction, although instruction can be helpful as well. Therefore, it is important to think about what kind of instruction and immersion experiences can be available to children. One of the successful strategies in the US is the bilingual immersion schools where students learn intensely in more than one language from early childhood and develop a high proficiency in their native language and public languages.

Another key question is developing the training for teachers who can give children the access to literacy development. It is important to think about what we want a universal system of ECE with highly trained teachers to look like. Currently, compared with the rest of the systems that are highly systematic, Singapore has yet to establish a well-developed system of training for early childhood educators. While there are excellent early childhood educators in private providers, it is a bunch of little systems rather than a coherent one. This is, in fact, an opportunity for Singapore to make some important improvements in this area.

**Audience member 3**: The presentation started with the discussion on values-based education systems and 21st century skills, and followed on by examining the features of quality education systems around the world. Inevitably, the discussion falls back on standardised tests. Could we hear your views about what represents quality education?

**Professor Darling-Hammond**: Some of my discussions were around the analysis that comes back to standardised tests. There is a limitation to a lot of the research because most of the current standardised tests do not actually measure the 21st century skills that we claim we are trying to develop. The development of those skills is going to rest on a set of broad enough ways of both defining educational success and eventually measuring educational success. So what do we mean by a high-quality education system?

It is one that is not only grounded in those outcomes from standardised tests, but one in which it is an open to all children. Equity should become a base in thinking about qualities. In addition, all children should have access to a “thinking curriculum”, in which students are challenged to problem-solve, think critically, evaluate, investigate, synthesise information, produce new knowledge, and demonstrate and communicate what they know in a variety of modalities and so on.

What is increasingly important is the ability to use knowledge in ways that have a creative element, which is not typically something that we pick up in standardised testing systems. Further, these should be done in a way that has both an ethical and values base. Quality education should enable people to empathise and work effectively with others, and to move their relationships with an ethical and moral base at a personal level, and increasingly at a community level and international level—it is a route that helps them survive much longer than developing skills alone.

A quality system also means that professionals in the system are knowledgeable about how to do good work in helping children, and are morally committed to their work. This is the vehicle by which other things are accomplished. Hence, a quality system is not only

about trying to teach the kids but also about what kinds of communities of schools and the capacities of educators that are embedded in that system.

While we can be constrained by tests, we can be liberated by assessments as well. Increasingly, more emphasis is being placed on the idea of assessing students authentically using multiple measures that allow us to see what they can do with their knowledge. In this regard, some adventurous work is being done in the examination systems such as in Singapore, albeit at a small scale. For example, the examinations in Science where students have to plan and do investigations on their own, set a problem, figure out how to solve the problem, and collect evidence and evaluate them. Although these innovations are not taking place in the whole set of tests, it has great potential and does get us closer to those 21st century skills. Therefore, the evolution of assessment is also a part of building a high-quality education system.

**Audience member 4**: I would like to share two personal observations. First, ECE is super important. However, it important to acknowledge that kids need to be kids now and again—falling from trees and falling off the bike are all part of the learning process. Second, with regard to the demand for a huge amount of knowledge-based skills, I would like to pull the concept of the police, where students can actually gain from vocational deployments. Not everybody has obtained a Ph.D degree or a Bachelor of Science or other degrees, but there are some really smart practical people in our societies. Therefore, acknowledging the fact that there are different ways of showing and gaining that knowledge is really important.

**Professor Darling-Hammond**: I agree with both of your observations and would like to elaborate a couple of points. ECE needs to provide play and hands-on learning experiences, and a language-rich environment. Play and hands-on activities are seen as an extremely important way of learning. In fact, it is the best way of early learning. But it has to be in a stimulus environment, where children have the opportunity to learn in the way that they learn the best. It may not necessarily go into early academics. However, music, art and language immersion experiences need to be part of that environment.

ECE should not make children who are 3 year olds into 8 year olds in terms of the educational experiences they are presented with. A case in point is a set of studies done in Germany some years ago. They followed kids in 50 play kindergartens and 50 academic kindergartens for about 6 years, from the age of about 3 to the age of about 9, to see what the later outcomes were. Results suggest that children from play kindergartens did better on almost every indicator such as reading, writing, engagement and self-confidence in school.

With regard to the roles of skills, it is not about stacking up more academic knowledge. We need skills that are important in every vocation such as flexible thinking and interactive communications. What lies in the core is developing the capacity in human beings to work well and flexibly with minds and hands in whatever vocations and pathways they pursue.

**Audience member 5**: The struggle that Singapore has is probably how to actualise the features of a high-quality curriculum and good schools in the local system, and practise it in a meaningful way. If we look at the system as a whole, the task for us may be not just tweaking existing structure, but also relooking at the structure itself and seeing how it can better fit the educational goals we wish to accomplish. Given the context of knowledge work, would you have any examples of how this system would look like?

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**Professor Darling-Hammond**: Obviously there are a lot of visions that one can develop a system to support knowledge work. But it takes a long time to envision a system as a whole. I would share some elements of the system that may be important.

One aspect would be thinking about how students encounter and work with knowledge. The conception of knowledge as transmitted and acquired that we have inherited from old systems is going to change. While it is still important to acquire information and facts, more of our work has moved towards the ability to evaluate and use knowledge in complex settings, as well as to create new knowledge in various ways. In the new system, we would see work around the acquisition of knowledge for particular problem-solving purposes; for example, high-quality project-based learning opportunities could be one of the avenues.

We may eventually have to rethink the ways we characterise disciplines and courses. Although the disciplinary structures we inherited are valuable in developing the mind such as thinking mathematically and scientifically, they are not sufficient for all the forms of applications that we are going to be encounter. Therefore, the curriculum will need to evolve to engage students in learning opportunities, knowledge acquisition and transformational opportunities in ways that are different from what we have today. The future classroom at NIE is a good example where interactive learning goes beyond classrooms to various places like subway trains and cafés.

To conclude, now is a time that we have to be able to open up our minds to the possibilities for learning everywhere, and apply knowledge in innovative ways that will require us to move beyond the system that we have today.

**References**

OECD. (2012). *Equity and quality in education: Supporting disadvantaged students and schools*. Paris, France: Author. doi: 10.1787/9789264130852-en

Zigler, E., Gilliam, W. S., & Jones, S. M. (2006). *A vision for universal preschool education*. Cambridge, UK: Cambridge University Press.

# EPILOGUE

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We are honoured to pen the epilogue for this issue. On behalf of the Office of Education Research at NIE, we would like to thank Professor Linda Darling-Hammond and the scholars, policymakers and practitioners at the roundtable discussion for their insightful ideas. We would also like to thank Associate Professor Low Ee Ling and the editorial board of the *CJ Koh Professorial Lecture Series* for summarising and consolidating in this issue the lessons we can learn from the talks and discussions in conjunction with the appointment of Professor Linda Darling-Hammond as the ninth CJ Koh Professor.

Individually and collectively, these talks and discussions engage with key contemporary issues in education: curriculum and pedagogical reform, learning and creativity, early childhood education and teacher learning. The epilogue pulls together the theoretical and practical significance of the talks and discussions and draws out from them important learnings.

The discussions presented here all begin with the idea that education is facing unprecedented challenges brought by the social, economic and technological advances in the new century, that educational policies and practices must respond to these challenges effectively. This perspective positions education as a key factor for social improvement and success, and the future of our children as our primary focus. The urgency and importance of transforming education for the new age call for immediate and mindful action from everyone. A quote from Alice Walker (1989), a famous

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African American author, reminds us to "Be aware of the present you are constructing; it should be the future you want." (p. 236).

Active, intentional and strategic actions are always required for the purpose of improving the quality of education for all. Professor Neil Mercer summed it up aptly when he said that children are "naturally creative but it's only through nurturing creativity that we'll be able to ensure that the potential is realised" (p. 18 of this issue). Like the flower, every child's nature is to blossom and flourish. However, it is the responsibility of us, as educators, to create a fertile ground for them to grow and become the citizens we wish them to be.

From the talks and discussions in this issue, several salient points emerge: the need for deeper learning, the issue of creativity in teaching and learning, the importance of providing high-quality early childhood education, and the importance of continual teacher learning. Each of these points will now be looked at in greater detail.

**Deeper Learning**

The ideas of "deeper learning", a term coined by Professor Darling-Hammond, and "thinking pedagogy" sound quite familiar to educators in Singapore. It is very much in line with the major national initiatives in the Singapore education system, such as *Thinking Schools, Learning Nation* (TSLN) and *Teach Less, Learn More* (TLLM).

As observed by Ng (2008), these initiatives signal a fundamental philosophical change in education from quantity to quality. These initiatives put critical and creative thinking, creativity and innovation, lifelong learning, and nationalistic commitment at the heart of education. What deeper learning calls for is not the accumulation of information and knowledge, but thorough understanding and the ability to innovate and solve real-world problems under new contexts. To realise deeper learning, pedagogy must be transformed correspondingly from the transmission paradigm to one that can empower and develop independent learners to meet the challenges of 21st century. Prime Minister Lee's comment (2004) on pedagogy echoes this very sentiment:

> I think that there is a lot we can do, and which we will do. But there is one thing which we shouldn't do and that is when we add more teachers, we better don't add more homework or increase the syllabus because that just defeats the whole purpose. Then we are back to square one. In fact, I think we should cut down on some of this syllabus. It would mean less pressure on the kids, a bit less rote learning, more space for them to explore and discover their talents and also more space for the teachers to think, to reflect, to find ways to bring out the best in their students and to deliver quality results.

**Creativity**

At an age when all nations are facing the pressures from globalisation and new technologies, children, who form the future of the world, need to be at their creative best to survive and thrive. The roundtable discussion's unique contribution stems from this awareness, and emphasises the need for innovation, imagination and creativity. It explores the concept of creativity, particularly in relation to assessment and pedagogical practices. Several insights can be drawn from the lively discussions.

First, creativity is not only an individual, but also a collaborative attribute, especially in an educational setting. However, in classrooms, a pedagogy that can facilitate collaborative creativity can be difficult due to the various factors influencing the processes, such as expertise, support, skills, leadership and communication (Baguley, Midgley, & Kerby, 2013).

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Second, creativity is often multidisciplinary. It requires the integration of knowledge and skills in different disciplines. Moreover, creativity is not confined to one or two subjects, such as Arts or Music, but can be found in other subjects as well.

Third, in order to nurture creativity, clear and coherent definitions of terms and concepts are essential. Some of the core concepts include creativity and assessment. How educators define these concepts will have significant implications for education policy and practice, teaching and learning. As argued by Professor Darling-Hammond, there is a distinction between creativity with a big "C" and a small "c". With regard to the idea of assessment, it can actually become a critical piece of teaching and learning if used carefully and thoughtfully. For example, it can help us identify the most effective pedagogical strategies or practices that encourage "deeper learning". To sum up, assessment can be beneficial if it is not used for ranking the students or competition, but used *for*, *of* and *as* learning.

Lastly, nurturing creativity requires competent teachers and creative pedagogy. Good teaching, as cogently argued by Professor A. Lin Goodwin, is creative in nature.

**Early Childhood Education**

The issue of early childhood education has been a focal topic in the current nationwide conversation of reforming and improving the Singaporean education system. This demonstrates Singapore's continuous effort of providing high-quality educational experiences. The discussion has been raised about offering every child the opportunity of going to high-quality pre-school learning. This attention is fuelled by the fact that the quality of kindergartens varies and that there is a shortage of high-quality early childhood educators.

Such concerns about early childhood education may not be new to the local education landscape. What is new is the heightened public discourse that involves policymakers, early childhood educators, teacher educators and concerned citizens from all walks of life. Indeed, it ought to be the commitment of all to ensure that all kindergartens are a vibrant place for children to play, to learn and to be equipped with the values, skills and knowledge for a successful school life. Truly, a quality early childhood education should be of concern to everyone, and everyone, in one way or another benefits.

**Teacher Learning**

If we were to choose one element that is crucial for the success of all the areas that we have discussed above, it would be the quality of teachers. Teachers are the lynchpins to ensure deeper learning, foster creative thinking and innovation, and for the provision of high-quality early childhood education. Learning is the way to change. Likewise, teacher learning is the way to improve teacher quality and the way to achieve a thinking pedagogy, as advocated by Professor Darling-Hammond.

Singapore is not only well cognisant of this fact, but also strives continuously to improve teacher learning. The Ministry of Education, schools and NIE form a unique tripartite partnership to ensure a high-quality teaching force. The *Teacher Education Model for the 21st Century* (TE21; NIE, 2009) at NIE aims to prepare competent teachers with the right values, skills and knowledge. It puts values at the heart of its teacher education programmes, which is in line with MOE's "student-centric, values-driven" initiative.

What the education system in Singapore aims is to ensure quality education to reach everyone, that no one is left-behind or unattended, throughout life—from early childhood to primary, secondary, tertiary

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and beyond. As educators and researchers, we must always keep this principle in mind and we are delighted to see the achievements Singapore has made in recent years, which further fuels our passion and optimism. Singapore is regarded as one of the high-performing education systems in the world that now many countries want to learn from. Visitors and scholars are showing great interest to learn about Singapore's schools, education policies, teacher education and teacher learning as well as education research. However, Singapore should not sit on its laurels and achievements, but always seek for continual progress and improvement.

Improving the quality of education is always a journey—one that is complex and full of challenges. Those of us who make the preparation of quality teachers and education research our life's work would be obliged to provide strong empirical evidence to support the Singapore education system in the process of evolving from good to great, and to help all children flourish not only in school, but also in their work and lives.

**References**

Baguley, M., Midgley, W., & Kerby, M. (2013). Creativity and collaboration in the education sector. *International Journal of Pedagogies and Learning, 8*(1), 53–54.

Lee, H. L. (2004, 22 August). O*ur future of opportunity and promise*. Address by Prime Minister Lee Hsien Loong at the 2004 National Day Rally at the University Cultural Centre, National University of Singapore, Singapore.

National Institute of Education. (2009). *A teacher education model for the 21st century*. Singapore: Author.

Ng, P. T. (2008). Educational reform in Singapore: From quantity to quality. *Educational Research for Policy & Practice, 7*(1), 5–15.

Walker, A. (1989). *The temple of my familiar*. New York, NY: Harcourt Brace Jovanovich.

***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 the late 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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