Siao See Teng
Maria Manzon
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Equity in Excellence

Experiences of East Asian High-
Performing Education Systems

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Series Editor's Foreword

The efforts to improve educational provision globally and across countries are all based on the belief that education can function as a change driver for individuals to strive for a better state of being, whether economically, socially, or culturally speaking. From a macro perspective, we believe education is a means for the eradication of illiteracy and poverty, equity promotion, and an overall improvement of the economic productivity of the country, as stipulated in the Asian Development Bank's *Framework and Criteria for the Appraisal and Socioeconomic Justification of Education Projects* (ADB, 1994, p. 5):

- Education can play a direct role in poverty reduction by enhancing the marketable skills of the economically disadvantaged and vulnerable groups and by expanding their ability to take advantage of income generation possibilities and available social services.
- Education plays a key role in promoting the interests of women and increasing their diversified impact and contribution to national development goals. Women must have equal access to and participation in educational activities.
- Through its impact on employment opportunities and earning potential, education alters the value placed on children and the willingness of parents to invest more in each child's development.
- Education contributes directly and indirectly to a higher level of sociocultural and economic development that provides sufficient resources to address effectively environmental issues.

However, the promise of education has not been fulfilled. A number of evaluation reports, such as the UNESCO Position Paper on Education Post-2015 (UNESCO 2014), the 2013 Priority Paper (UNESCO & UNICEF, 2013), and the Global Education Monitoring Report 2017 (UNESCO, 2017), have provided similar observations that the same problems persist, despite tremendous efforts expended by governments and international agencies. As highlighted by the Priority Report (UNESCO & UNICEF, 2013, p. 5) in regard to the EFA agenda, progress toward getting all children into school is too slow. The 2017 Global Education Monitoring Report (UNESCO, 2017, p. 118) highlights the following:

- In 2010–2015, completion rates were 83% for primary, 69% for lower secondary, and 45% for upper secondary education.
- About 387 million children of primary school age, or 56%, did not reach the minimum proficiency level in reading.
- Less than one in five countries guaranteed 12 years of free and compulsory education.

The problem may be due to some fundamental presumptuous issues such as the embeddedness of inequality and inequity in societies, which is hard to eradicate. As reported widely, the income gap between the rich and poor is generally rising in modern societies today, despite the increasing universalization of education across the world. The Gini coefficient index in many countries continues to be high even though their educational provision is basically universal. Furthermore, although everyone can go to school, new pedagogical strategies that seem to liberate learners are requiring better familial resources to support, such as the additional resources to buy computer equipment, pay internet subscription, and finance all sorts of training for cocurricular activities, such as music, sport, and art engagements, as well as participation in all kinds of exchange, study abroad and immersion programs, plus internships. The increased exposure to experiential learning in school requires quite a lot of additional resources from home to support, in order for the engaged children to benefit from all these new provisions in school. Unfortunately these new educational goals and practices may lead to new forms of poverty (Lee, 2007). For example, many development analysts have already identified the emergence of urban poverty. The many educational reforms reviewed above suggest new educational emphasis on middle-class culture and requirements for significantly more resources for individuals to meet those new educational targets. The disadvantages imposed upon relatively poor families will make it hard to break the poverty cycle since the reforms and additional demands for academic performance may perpetuate disadvantage in spite of the achievement of equal educational opportunity in terms of access. Eradicating inequalities solely through education may result in perpetuating poverty. Therefore, governments need to consider measures to help the relatively poor meet the new demands in educational reforms that require new resources to achieve.

The recent discourse on "equity and quality" seems to be one good solution to create a turning point in resolving those issues. The analyses of factors of success in OECD's various PISA studies over the past 15 years appear to offer some insights that can bring about a different perspective to resolve the issue. Their main major finding is that if we study the high-performing countries in the various PISA exercises, these countries have not resolved the income gap issue, as indicated by their high Gini indices. However, what they have observed is that even under such circumstances, if governments spend efforts to improve the quality of education provided, such as elevating and standardizing the quality of teaching and school environments, students coming from disadvantaged families, such as low-income and immigrant families, will have equal chances to excel in the education system. One illuminating finding from the PISA assessments is the identification of

"resilience index." It suggests that in high-performing countries, the percentage of resilient students is also high. Despite coming from unfavorable socioeconomic status (SES) backgrounds, these students can still attain high achievements in the PISA tests. Both the Grattan Report (Jensen, 2012) and Asia Society Report (2012) shared the same observation that high-performing education systems are those countries which are able to manage both equity and quality in education, that is, they achieve equity by raising the general quality of schooling.

In a paper discussing the directions for the post-2015 education agenda, Sayed and Ahmed (2015, p. 335) point out that:

> The analysis thus far suggests that the articulation of equitable and inclusive quality as a goal cements the turn towards prioritization of quality and frames its pursuit within a social justice perspective, consistent with the emphasis on education as a human right and as a public good. This is potentially a huge quality agenda.

Indeed, the Priority Paper (UNESCO & UNICEF, 2013) has also picked up "equity as quality" as a new thinking and direction toward the achievement of the EFA goals toward 2030. It is hoped that the new target, with a focus on educational quality, will be able to bring about a new phase that can enhance the achievement of EFA for most of the countries in the world.

This book is a new attempt to analyze equity and quality issues in the context of East Asia, particularly Singapore. The high performance of East Asian education systems in international education tests conducted by IEA and OECD PISA has attracted much international attention. For example, the Grattan Report (Jensen, 2012, p. 9) makes the following observations:

- High-performing education systems in East Asia have successfully increased performance while maintaining, and often increasing, equity. Compared to Australia and most OECD countries, a child from a poorer background in these systems is less likely to drop out or fall behind.
- There is less of a gap between high- and low-performing students in Korea, Shanghai, and Hong Kong compared to many other OECD education systems.
- Low-performing students are better prepared for their future. The bottom 10% of math students in Shanghai perform at a level that is 21 months ahead of the bottom 10% of students in Australia. This gap rises to 24 months in the UK, 25 months across the average of the OECD, and 28 months in the USA.
- Increasing performance and equity has been achieved with high and increasing participation. For example, 30 years ago, about 40% of young Koreans (aged 25–34) finished secondary education. Now the figure is 98%, 10 percentage points above the OECD average.

Despite international recognition, the "insiders" of the East Asian education systems tend to focus on their own weaknesses, rather than the strengths that their international peers accorded to them (see Lee, Lee, & Low, 2014). The value of this book lies in the reflections provided mostly by Asian scholars who, far from celebrating the perceived attainment of equity and quality (or excellence, as termed in this book), lament the difficulties of removing inequities. Many of the reforms

introduced to tackle inequities, in practice, generate new inequities perhaps in part because the education sector is a microcosm of society and complex social causes of poverty cannot be resolved by school reforms alone. The expansion of educational goals, such as experiential learning, requires additional resources from families. Instead of improving educational performance through the promotion of home-school collaboration, several authors in this book found reverse outcomes. "Parentocracy" emerges with more resourceful middle-class parents taking advantage of this opportunity to cultivate further forms of cultural capital for their children, resulting in the continued disadvantage of students coming from underprivileged families.

In addition to providing an insider's critical review of their own education systems from the lens of equity and excellence, authors of this book also provide rich and valuable information on how education systems reform themselves toward enhancing equity and quality/excellence through policy and pedagogical adjustments that address issues such as differentiation with inclusive ideals and measures. The chapters on classroom research are particularly valuable in informing how Asian educators reform their pedagogies in order to make the learning process more equitable for students, reducing the impacts of their SES backgrounds. One such effort is to introduce "working memory" strategies, so that the learnable moments of the students can be captured by both teachers and students, leading to more effective learning in the classroom. This way, in addition to the macro policy reforms toward equity, the micro pedagogical reforms will improve the learning process that will benefit the majority of students in the classroom, regardless of their SES backgrounds.

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Contents

Part II   Striving for Equity in Excellence: The Singapore Experience

Chapter 1
Equity and Excellence in East Asian High-Performing Education Systems – A Paradoxical Relationship?

Siao See Teng, Maria Manzon, and Kenneth K. Poon

A number of East Asian[1] education systems (e.g. Hong Kong, Japan, South Korea, Shanghai, Singapore and Taiwan) have gained international prominence over the years, due to their rapid climbs to top positions in international tests such as the Programme for International Student Assessment (PISA), Progress in International Reading Literacy Study (PIRLS) and Trends in International Mathematics and Science Study (TIMSS). For example, Hong Kong was placed 17th in PIRLS reading literacy, and Singapore ranked 15th in 2001, but within 5 years, they garnered 2nd and 4th places in 2006, respectively. In the 2015 PISA results, Singapore, Hong Kong, Taipei, Japan and Beijing-Shanghai-Jiangsu-Guangzhou (B-S-J-G), China, were top achievers (OECD, 2016).

The sterling report cards of these East Asian systems, combined with the declining performance of western systems such as those of the United Kingdom and the United States, have led the West to a "look East" drive for inspiration. Whether it be scholarly publications or media articles, much literature has been generated on the "success" of education in East Asia, which has become "the new 'poster boy' in the global discourse of education policy borrowing" (You & Morris, 2016, p. 883).

Increasingly, a good education system is considered one that not only produces high achievements but is also equitable in terms of the distribution of its success

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[1] Although we do not subscribe to a monolithic East Asian region, an extensive deliberation on the concept of the region is beyond this book. It suffices to note that while Singapore is situated more specifically in Southeast Asia, its inclusion in this volume is due to the fact that it has often been linked with and discussed alongside high-performing East Asian systems. A chapter on South Korea education was planned but the idea was dropped due to unforeseen circumstances.

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across the system and its student population. As stated in a 2012 OECD report on equity and quality in education (p. 17):

> An emerging viewpoint across OECD countries is that education systems must provide successful educational outcomes for all students. Increasingly, it is no longer seen as adequate to provide equal access to the same "one size fits all" educational opportunity. More and more, the focus is shifting towards providing education that promotes equity by recognising and meeting different educational needs.

Also reflected in the PISA reports over the years is the high ranking of these East Asian education systems in equity. There is a tendency for admirers of the high-performing East Asian systems to focus on its "successes", while critics would argue that not all is rosy, pointing out the existing inequities found in them (for instance, differential means to provide quality private tutoring). Perhaps a more nuanced understanding of these East Asian education systems could be facilitated if we could examine them considering both equity and quality issues, since the pursuit of each often affects the other. The chapters in this book illustrate that excellence and equity are not independent and separate but can be paradoxically intertwined.

Equity and Excellence

Traditionally, the notion of *excellence* refers to a fairly narrow definition of achievement in terms of academic achievement and potential. Examinations form the most definitive form of assessment for excellence in academic achievement. This concept of excellence is, however, increasingly being challenged by the competing values, styles and frames of intelligence as schools incorporate increasingly diverse student populations. Instead, the excellence of an education system is becoming associated with the level of equity manifested in the system.

According to the OECD, *equity* comprises two components: fairness and inclusion. Fairness refers to how an individual, regardless of his or her personal background and social circumstances (e.g. socio-economic status, ethnicity and gender), is able to achieve his or her educational potential. Inclusion refers to a minimum standard of education for all: everyone should be able to read, write and do simple arithmetic (OECD, 2008). In contrast to *equality*, which has often been measured in a quantitative manner (receiving equal/same amount or level of assistance), *equity* refers to the quality of service afforded to each person. Thus to ensure quality education for each individual student, this would mean being "regardful" of his or her social background in order to provide for all "regardless" of the social categorical group he or she belongs to. Understanding diversity and differences is therefore a prerequisite for the execution of inclusion and fairness.

Educational Equity in East Asia

For most of the East Asian societies as we know them today, education after the Second World War was very much a means through which the state forged citizenry and developed manpower for economic needs. They experienced the massification of education and the rise of the middle class, which were often accompanied by the growth of the private education sector and greater differentiation within the existing education system (Altbach and Umakoshi 2004). This had substantial impact on the educational landscape in these societies, providing more equal opportunities in some areas while maintaining or creating new inequities in others. In response to both global and national socio-political and economic developments, most of these societies are also marked by a "centralised decentralisation" in which central governance still played a key role in the education sector's reforms in the last few decades (Mok, 2006). This feature acts at times as both a condition and constraint in the enforcement of equity measures. Certain observable phenomena such as increased credentialism, examination-oriented education culture and supplementary private tutoring culture form common challenges that many education systems in East Asia have to contend with.

Efforts have traditionally been focused on closing the gaps premised on differences relating to gender, socio-economic status and ethnicity. The forces of globalisation and migration, however, have brought on similar challenges in terms of greater demographic and student population diversification. Internal migration has brought many mainland China migrants to Hong Kong, while external migration saw significant numbers of migrant workers from far-flung countries such as Brazil, in Japan. The demand for foreign brides particularly among local rural and low-income men led to an increase in international marriages and the likes of "multicultural children" (South Korea), "New Taiwanese" and "New Singaporeans", born to local fathers and their migrant wives. These diversifications added layers of complexities to the existing discrepancies premised on gender, ethnicity and class and have, over the years, gained greater currency in societal and educational discourses and attention from policymakers. Apart from the attention to the newcomers, students with disabilities and special needs have also increasingly become part of the equity discourse in Asia. Discussions often meditate on the meaning of inclusive education, such as whether putting students with disabilities into special education schools or mainstream schools constitute inclusion.

Cross-referencing certainly has the potential to help each education system refine and review its policy directions, measures and initiatives. Besides offering much insight to international literature in terms of how both quality and equity in education are navigated in these East Asian systems, commonalities in their societal contexts provide relevant cross-references for one another in terms of anticipating emergent issues and assessing strategies to tackle challenges. References to "elite groups", "elite schools" or "elite-oriented education system" when discussing concerns over equity in many of the chapters of this book suggest that elitism remains very much a challenge in East Asian education systems after the massification of education.

With all the systems having to deal with a greater diversity of students, it would be even more critical to deliberate on when and how differentiation (of curriculum, instruction, programmes, schools, etc.) caters to diversity and when it leads to stratification. In Keita Takayama's words in the first chapter of this book: "We need to ask which elements of standardised education systems contribute to overall educational excellence and equity and which are more likely to produce suppressive effects on standardisation, on teachers and children and thus are in need of more differentiation and flexibility" (p. 18).

For effective cross-referencing to take place, the particularities of the societal context of each education system needs to be factored in. These institutional, social and cultural contexts, often overlooked in the literature on the successes of the high-performing education systems (HPES), of which the East Asian top performers in PISA are prominent features (Deng & Gopinathan, 2016; Lee & Manzon, 2014), are nevertheless integral to the understanding of how equity challenges emerge and are negotiated. While the East Asian HPES have often been associated with Confucianism or Confucian heritage culture, many of them are found in societies which have undergone major transformations in the last century; most have experienced war, decolonisation and modernising industrialisation. There were also the disruptive Cultural Revolution in China, for instance, and the initial "desinicisation" in early independent Singapore, as the newly minted country steered clear of the impression of a third China in the Cold War era (Tan, 2003). Thus, cultural continuities should not be assumed, and discontinuities need to be taken into account before convenient attribution of any educational phenomena to this cultural thesis takes place across East Asian systems. Key political and societal developments would need to be considered in understanding and analysing education in East Asia.

Equity in top-performing East Asian education systems is a relatively under-researched area in the international literature. How each system in the Asian region attempts to enhance equity in practice may differ intra-regionally and from the West. Instead of seeking an overarching definition, the editors of this volume attempt to capture the particularities of how each system interprets and approaches equity, by getting authors to relate their discussions of policy and/or practice to the meanings and forms of equity they see and research on. The editors of this volume hope this book will make a modest contribution towards a cross-referencing dialogue on inter-Asian education systems.

Singapore: Striving for Equity in Excellence

As this volume was conceived as part of the Springer *Education Innovation Series*, previously based at the National Institute of Education (Singapore), a more focused commentary on the Singapore context is included here. With its increased concern over social stratification and social mobility issues in recent years, and education seen as a key domain to handle these challenges, Singapore is apt as a country case to explore.

Singapore is no stranger to attempts at levelling up students who fall behind. One of its earliest efforts in this area was systemic differentiation introduced in the late 1970s, in the form of between and within school differentiation premised on the results of high-stake examinations. This aimed at the reduction of drop-out rates and an increase in the literacy and education levels of the workforce. From the 1990s, targeted efforts with financial assistance and learning support schemes were introduced, and later more pathways were opened to enable more flexible student movement from lower to higher streams and varied routes to higher education institutions. Specialised schools for potential drop outs as well as those for the vocational stream were also established (Wang, Teng, & Tan 2014).

In spite of the above developments, it has been pointed out that there may be limitations to Singapore's levelling-up efforts if its conception of equity as equality of opportunities means a system "desensitised to persistent gaps in the learning outcomes among students, to the extent that the society may not critically reflect about the education policies and pedagogical practices and identify specific elements that may contribute to these gaps" (Teh, 2014, p. 81). In face of greater diversification of the student population as well as the increasing income gap, the positioning of Singapore's education system as the cradle of meritocracy has come under doubt (see, e.g. Chong, 2014; Koh, 2014; Lim, 2013). Even Singapore Prime Minister Lee Hsien Loong has acknowledged stratifying effects in the country (Lee, 2011). Recently, a study by the Institute of Policy Studies in Singapore on social capital published in late 2017 found clear divides between social classes, with people from "elite schools" or who live in private housing tending to have less ties with those who studied in "nonelite schools" or lived in public housing (Chua, Tan, & Koh, 2017). Education Minister Ong Ye Kung has also talked about the risks social stratification posed to Singapore and the direction of education policies to deal with the challenge (Ong, 2018).

Although consistently appearing in the top ranks in PISA and TIMSS over the years, Singapore is also the leading system that has a comparatively longer tail end of the lowest percentile of achievers among its East Asian counterparts (Teh, 2014). The 2015 PISA results revealed that Singapore had the highest social background impact on performance, ahead of Taiwan, Hong Kong, Japan and South Korea. Similarly, the same sets of results showed that Singapore has the highest social gap between advantaged and disadvantaged students among the above-mentioned societies (OECD, 2016).

Singapore also has other features that make it a distinctly interesting society that has much to offer as a country case. For instance, its student population is one of the most diverse among the top Asian education systems. It is also a system where the medium of instruction is not the home language for a relatively high proportion of its student population. Authors writing on Singapore education in this book have mentioned language challenges relating to parental support and conducting screening tests to identify at-risk students or carrying out intervention programmes in English for students coming from non-English-speaking homes, of which minority students form a significant group. These features contribute to the complexity of catering to all students in Singapore schools.

Layout of the Book

This book is divided into two parts, each with an opening chapter that offers a general discussion on the theme of each section in reference to other chapters in the section. Part I, "The Pursuit of Equity in Excellence in East Asia", comprises chapters focusing on selected top-performing East Asian systems[2], while Part II, "Striving for Equity in Excellence: the Singapore Experience", presents Singapore as a country case study.

Part I delineates the existing equity issues, policy direction and the challenges of some of the most prominent East Asian education systems. It includes a commentary on the existing discussions on equity in East Asian education systems, comprehensive macro-overviews of the equity policies and initiatives that have been introduced in Shanghai and Taiwan and also inclusion deliberations pertaining to "newer" groups such as migrant students with disabilities in Hong Kong and newcomer students in Japan, as well as how institutional structures shape inclusion in Singapore.

Part I opens with Keita Takayama's Chap. 2, "Towards East Asian Dialogue: Thinking Through the Policy Contradictions of Equity and Excellence in East Asian Education". He identifies the common equity challenges facing East Asian education systems, raises questions on the way knowledge and discourse on education concerns in East Asia are formulated and advocates "Asia as method", delineating the value of cross-referencing among the East Asian systems in the midst of new disparities.

In Chap. 3, "Education Reform in Shanghai in the Era of Globalisation: Towards a Balanced and Innovative System?", Zhiyong Zhu and Meng Deng offer a review of the key policies and practices improving educational quality and equity, initiated in Shanghai over recent decades. Efforts include those aimed at urban-rural schools, "key" and neighbourhood schools, public-private schools and special education schools. Attention is drawn to how educational developments in Shanghai should be understood within both convergence and tensions between the global and local and the local social structure under which the central government in Beijing retains substantial control over policy-making and resource allocation.

Chapter 4, "How Taiwan Education Pursues Equity in Excellence", reviews initiatives and reforms Taiwan has embarked on to improve education equity amidst significant political and societal changes in the territory. Prudence Chou notes how policy directions since the 1990s attempted to support underprivileged students from rural areas, provide equal education opportunity to aboriginal students, safeguard gender equality in education and also cater to students with disabilities. However, the disproportional inclusion of disadvantaged groups such as the aboriginal students and the "New Taiwanese" in higher education illustrates the

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[2] The South Korean system is commonly known as a top-performing education system in East Asia. Unfortunately, due to unforeseen circumstances, our planned chapter on South Korea education did not materialise.

continual challenges faced by the Taiwanese system in achieving both quality and equity in education.

In Chap. 5, "Hong Kong's Journey Towards Equity in the Era of Appropriate Education for All", Kim Fong Poon-McBrayer traces the educational equity trajectory of Hong Kong from post-war to postcolonial times with a focus on the education for students with disabilities as well as minority students, particularly non-Chinese speaking (NCS) migrants. While major advances have been achieved, further work needs to be carried out in relation to minority students with disabilities who possess double marginal identities in Hong Kong.

Miki Sugimura explores in Chap. 6, "Rethinking Equality and Equity in Multicultural Education in a Diversified Society: The Case of Language Education for Newcomer Students in Japan", the developments of multicultural education in Japan among "newcomers"—mainly Brazilian and Peruvian migrants, in what was formerly regarded as a homogenous society. The distinction between equality and equity in education is deliberated through the discussion of language education provision for these migrants' offspring. The author emphasises the need to consider the context and projected needs of the "newcomers" who possess diverging views on whether Japanese language or mother tongue education serves them better.

Chapter 7, "'Bridges and Ladders': The Paradox of Equity in Excellence in Singapore Schools", authored by Dennis Kwek, Rifhan Miller and Maria Manzon, analyses the Singapore education system's attempts to cater to the diverse abilities and needs of students with multiple pathways using the metaphor of "bridges and ladders". The authors note the ironic "paradoxical 'double effect' of achieving equity and excellence while reinforcing intractable pathologies of inequity". Highlighting the concept of "ecology of equity", the chapter emphasises the importance of taking into consideration the complex processes at work from individuals to schools to the system in order to tackle equity issues in a comprehensive manner.

Part II focuses on Singapore as a country case study of a high-performing education system with a relatively lower level of equity among its Asian high-performing counterparts as reflected in the PISA findings. A broad discussion on educational equity concerns and counteracting measures in Singapore is covered here: from education and meritocracy in Singapore to parental involvement of migrant mothers, to the policy and initiatives for preschool children with disabilities, to improving Mathematics education for Malay pre-schoolers and to primary school intervention at the individual/classroom level.

Jason Tan's Chap. 8, "Equity and Meritocracy in Singapore", sets the broad context within which educational equity could be understood in contemporary Singapore. Particularly, the significance of family background and implications of current trends relating to "parentocracy" on educational outcomes is highlighted. Referencing other chapters on Singapore education in the book, the chapter raises issues to consider with regard to the future direction of Singapore's education system and schools, as Singapore continues to strive for educational equity and excellence.

Siao See Teng's Chap. 9, "Diversity and Equity in Singapore: Parental Involvement in Low-Income Families with Migrant Mothers", provides insights into the parental involvement of rarely researched low-income families with migrant mothers in Singapore. Through interviews with these migrant mothers supplemented with ethnographic explorations, the chapter throws some light on the profiles of these families and the kind of parental involvement they provide to their children in the home and beyond. Their navigation around challenges as well as potential efforts within and outside schools to provide support for the children in these families are also discussed.

Kenneth Poon examines in Chap. 10, "Policies and Initiatives for Children from Disadvantaged Environments and Children with Disabilities in Singapore", Singapore's efforts in supporting disadvantaged students and students with disabilities at the preschool education level. He anticipates developments in early childhood intervention in the area of screening and assessment, building of a centralised evaluation and monitoring system, greater coordination between government bodies to facilitate children's transitions between environments, ensuring the access of resources and training manpower with the necessary capabilities to effectively support the children.

Chapter 11, "Helping Children with Mathematical Difficulties Level Up: Evaluating the Efficacy of a Novel Updating Training Programme", authored by Su Yin Ang, Kerry Lee, Kenneth Poon and Imelda Suryadarma, investigates the cognitive functions of students who are underperformers in mathematics, as part of the effort to identify assistance for them. Implementing an intervention study on working memory involving computer games, the researchers explore the possibilities of supporting underachievers.

In Chap. 12, "Early Intervention of Malay Preschool Teachers in Promoting Children's Mathematics Learning", Pamela Sharpe and Sirene Lim identify preschool as a vital intervention ground to address the underperformance of Malay students in Singapore. The chapter documents and evaluates an intervention programme aimed at informing stakeholders how preschool educators' knowledge could be improved with the redesigning of lesson plans, teacher training and mentorship.

On the whole, this book takes into consideration the above discussions of excellence and equity, broadening the scope of "achievement" and tackling issues of inclusion within greater diversity. Adopting a more comprehensive approach, it also contextualises conceptions and practices of equity in excellence amidst certain phenomena in these Asian societies, such as the stress endured by students in these high-pressure competitive systems and the high rates of private supplementary education participation. Employing multidisciplinary perspectives in discussing equity and excellence, this volume will contribute to understanding policies and practices in East Asian education systems and address gaps in the literature on equity. The editors hope that it will encourage more inter-Asia discussions and research on an education topic the region is so deeply concerned with and have much relevant experience to share. This book will cater to the interests of researchers, policymakers and educators internationally.

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Part I
The Pursuit of Equity in Excellence
in East Asia

Chapter 2
Towards East Asian Dialogue: Thinking Through the Policy Contradictions of Equity and Excellence in East Asian Education

Check for updates

Keita Takayama

Looking East

Hong Kong, Shanghai, Taiwan, Singapore and Japan, the cities and countries featured in this section of the book, were some of the top performers in the last few rounds of OECD's PISA wherein they, along with Macao and South Korea, dominated the top rankings of the global league tables. Their success stories in demonstrating how both excellence and equity can be achieved together have swept through the English-language media and policy discourse, prompting prominent political figures in Australia, the UK and the USA to learn from 'East' (Sellar & Lingard, 2013; Waldow, Takayama, & Sung, 2014), though much of the learning from East call was based on a highly selective reference to East Asian education policies to legitimize long preferred policy agendas (You & Morris, 2015) or on reform advocates' nostalgia for a more didactic approach to teaching, which was presumed to be still alive in East Asia (Forestier & Crossley, 2015). Regardless of whether this 'learning from East' trend is genuine or phony, the infatuation with East Asia in the Anglo-American education policy circle is likely to stay for some time particularly against the backdrop of Asia's rising economic and political influences. Part of the responsibilities of scholars researching East Asian education today then is to provide more contextualised accounts of their success stories to pre-empt any unintelligent form of policy learning and borrowing from East.

What is often overlooked in much of Programme for International Student Assessment (PISA)-related reporting of East Asian educational success are the educational challenges of minoritised students in these cities and countries. Unlike countries such as Australia and New Zealand where PISA data about student ethnic and language backgrounds are collected and correlated to student test scores, these high-performing Asian 'PISA stars' do not collect such data (or do not publicise the

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data), hence excluding the problem of educational disadvantages faced by migrant and indigenous children from the international PISA success stories and the domestic policy debates on PISA outcomes. This is particularly worrisome given that these cities and countries accept a large number of both highly mobile transnational professionals and inter- and intranational migrant workers with school-age children, as detailed in Chou's Chap. 4 on Taiwan, Zhu and Deng's Chap. 3 on Shanghai (see also Deng & Zhao, 2014) and Poon-Mcbrayer's Chap. 5 on Hong Kong.

Furthermore, some of the countries have a history of institutionalised discrimination in education and are faced with the consequent academic disparity of particular ethnic and indigenous population, as detailed in Sugimura's Chap. 6 on Japan, Chou's Chap. 4 on Taiwan and to some extent Kwek, Miller and Manzon's Chap. 7 on Singapore. The five chapters provide much needed detailed descriptions of the state of educational disadvantages faced by minoritised children, which are often glossed over by the aggregated data sets upon which PISA rankings are assembled and the celebratory accounts of Asian Tigers' PISA success rest.

This lack of attention to minoritised children contrasts with PISA's focus on socio-economic disadvantages in education. Historically, East Asian countries have attempted to address socio-economic disadvantages in education by universalising the standardised primary and early secondary education for all. This policy focus on educational access is premised upon the belief that 'SES (socio-economic status) should count for little if the school is fair and effective' (Gopinathan, 2007, p. 67). Universal access to quality education, standardisation of curriculum, egalitarian distribution of resources, pedagogic belief in effort and 'objective' and standardised examinations have long served as the central pillars for the legitimacy of education systems in East Asia. According to this logic, the universalisation of primary and secondary education has already 'solved' any inequity issues in the system; the consequent socio-economic gap in educational outcomes simply reflects individual student's merit (hard work and talent). Until recently, therefore, the East Asian governments did not systematically collect socio-economic data about children and their academic outcomes, and PISA, with its focus on socio-economic disparity in learning outcomes, helped put this issue on policy agenda in some of these countries (see Takayama, 2012).

In the following pages, I attempt to generate a set of insights and perspectives about East Asian education and the commonly shared policy challenges around the issue of educational inequalities. This will not only be undertaken through my engagement with the nation-specific accounts provided by the five following chapters but also on the basis of what I have written elsewhere and other studies that examine educational policy issues pertaining to East Asia as a whole. Here the task for me is to generate a regional dialogue about educational equity and excellence, while keeping in mind how this attempt could omit important differences among the countries and economies discussed by the chapters.

Having said that, I am also acutely aware of the possible epistemic violence that my regional framing might generate. The problem of 'methodological projection' (Connell, 2007, p. 64) immediately comes to my mind. That is, I draw on concepts developed by Japanese scholars (e.g. Takehiko Kariya and Yuki Honda) in order to

develop my understanding of the shared challenges of educational equity and excellence in East Asia. I have to constantly ask myself; am I 'projecting the traits already recognised in metropolitan society' (Japan) to fabricate a picture of East Asia (Connell, 2007, p. 64); what has been made visible and invisible as a result of my reliance on intellectual resource offered by Japanese scholars? I see this chapter, therefore, as a necessarily imperfect attempt to open up space for a regional dialogue in East Asia.

To advance the agenda for East Asian dialogue further, this chapter not only identifies the common educational inequality challenges faced by the select East Asian countries and cities. But drawing on Kuan-Hsing Chen's (2010) work on 'Asia as method', it also raises questions about the way in which education scholars and policy makers in the region have related to each other in developing knowledge about and for education policy concerns. I argue that this 'knowledge question' has considerable implications for the extent to which East Asian countries and economies can achieve the intricate balance of educational excellence and equity.

The End of East Asian Model (J-Model)

Historically, the governments in East Asian countries have relied on the highly centralised and standardised provision of education or what Sugimura in her Chap. 6 on minority education in Japan refers to, after Manabu Sato, 'the Japanese model' or the J-Model (Cummings, 1997). William K. Cummings (1997) argues that the Japanese model of human resource development has been taken up by other East Asian societies, including Taiwan, Korea, Thailand, Singapore, Malaysia and Indonesia. In particular, the universal provision of primary and early secondary education was given the utmost importance in the overall human resource development strategies. It was viewed as the key strategy to address the educational quality and equality issues. Instead of recognising individual disadvantages on the basis of students' sociocultural backgrounds (social class, ethnicity, language and 'race') and allocating resources to compensate for them, the governments focused on universalising the quality learning environment for all through the standardised curriculum and the egalitarian distribution of funding and teaching workforce (Kariya, 2009), though the extent to which this has been achieved varies among East Asian countries.

Against the backdrop of steady economic growth in the last several decades, East Asian countries achieved more equal distribution of educational resources at the primary and junior secondary school level than other advanced economies of the West while at the same time maintaining the highly selective secondary and university systems. As rightly put in Zhu and Deng's Chap. 3 on Shanghai, education is 'a selective mechanism to achieve upward social mobility', and the role of government is to 'provide an open opportunity for all to compete with each other' (pp. 11–12). Hence, the universal provision of standardised primary and early secondary education has been the cornerstone for the logic of meritocracy as enacted

in East Asian education, or 'a real source of upward mobility' (Gopinathan, 2007, p. 66; see also Kwek, Miller and Manzon's Chap. 7). This belief in 'fair' distribution of social goods through educational competition was the powerful ideology mobilising the mass population towards intense educational competitions and as a result enabling the East Asian developmentalist states to closely align education and training systems with state-determined economic policies.

Central to the East Asian model of meritocracy is the prevalent use of high-stake standardised testing as a means for a 'fair' distribution of social and material rewards on the basis of students' 'merit'. In this model, the principle of meritocracy was structured around the standardised assessments of a set of largely decontextualised knowledge and skills. This was viewed as the most effective way to manage the procedural fairness; the 'objectivity' of academic assessment and hence the 'fairness' of competition were to be achieved through artificial decontextualisation of knowledge and skills that are tested in the paper and pencil format. It was accepted as a reliable way of assessing student 'merits', which are expressed in terms of how well students acquire valued knowledge and skills (Honda, 2005; Deng & Zhao, 2014).

For sure, the tested knowledge and skills were never completely decontextualised and indeed inherently linked with unequal power relations in larger society that defined whose knowledge and skills were to be of most worth (Lim, 2013). However, it is also true that students' hard work and dedication in internalising a set of decontextualised knowledge and skills, coupled with universal provision of standardised education, schools' effective teaching and equitable resource allocation measures, could reduce the influence of socio-economic, cultural and 'racial' status on students' academic achievement, though the extent to which this was achieved in East Asia should not be overstated (see Chou's Chap. 4 detailing the persistent educational disadvantages of Aboriginal children in Taiwan; also see Lim, 2013 in the context of Singapore and Deng & Zhao, 2014 in Shanghai).

Over the last few decades, this East Asian approach to educational quality and equality has been under scrutiny, partly due to the increasing number of children who are 'othered' in terms of language, ethnicity and ability/disability differences. These children and their parents demand their individual differences be recognised and adequately catered for in education systems. Such children's rights-based discourse has been infused with the quasi-market discourse of education reform whereby parents and children demand their specific interests and preferences to be met. This often results in the demands for curricular relevance to children's individual interests and needs, which are often translated into individualised instructions, parental choice (e.g. school choice) and increased autonomy of teachers and schools.

Hence, standardisation and centralisation, which had been the twin pillars of East Asian educational excellence and equity, are now increasingly questioned, viewed to have suppressed children's individual differences, creativity and joy of learning. As Poon-Mcbrayer states in her Chap. 5 on Hong Kong, the accepted norm today is that 'every child should have an individualised educational programme rather than a single curriculum and performance standard' (p. 14). The ongoing reforms in these East Asian countries and cities, driven by the child-centric,

constructivist theory of teaching and learning (see Zhu and Deng's Chap. 3 on Shanghai and Chou's Chap. 4 on Taiwan) and the systemic shift towards more flexibility, differentiation and parental choice (Poon-Mcbrayer on Hong Kong; Kwek, Miller and Manzon on Singapore; also Gopinathan, 2007), all reflect the governments' attempt to 'relieve the stress of intense entrance exam preparation and allow students to pursue their own interests' (see Chou's Chap. 4, p. 51). Underpinning this policy shift is the view that children in East Asian countries are suffering from low self-esteem, low motivation for learning, lack of creativity, problem-solving skills and entrepreneurship as a result of the competitive and standardised education systems, and they are inadequately prepared for the reality of knowledge-based economy. Out of such concerns has emerged, for instance, the 'bridges and ladders' model of Singapore's education system, which is designed 'to cater to the varied strengths and needs of students, and provide[s] more options for students at different stages of education' (Kwek, Miller and Manzon's Chap. 7, p. 94).

New Inequality Challenges in East Asia

The question of educational inequalities in East Asia must be examined in the context of this larger systemic shift away from centralisation and standardisation towards differentiation and individualisation. Indeed, studies have shown that this change could have serious, unintended equity consequences. Based on his secondary analysis of PISA and TIMSS data sets, Hyunjoon Park (2013), for instance, suggests that the recent curricular and systemic reforms in Korea and Japan, characterised by the shift away from standardisation towards differentiation and individualisation, might have caused the widening disparities in educational outcomes. Though his discussion fails to take into consideration the effect of increasing social class divide, witnessed in these two countries during the last two decades, on socio-economic educational achievement gap, his call to preserve the 'core elements of standardised education' (p. 129), which he sees as fundamental to educational success of Korea and Japan, seems warranted. Park warns that the ongoing education reform in these two countries, which essentially undermines the core elements of standardised education systems, might be driven by 'the untested and oversimplified criticisms against the standardised system' (p. 6).

Though to what extent the reform initiatives described in the five chapters are driven by 'the untested and oversimplified criticisms against the standardised system' remains to be carefully examined, the remarkable similarity of the reform measures undertaken in these countries to those in Korea and Japan suggests a degree of applicability of his warning. Most of the chapters in this section seem to leave unchallenged the ongoing curricular and systemic reforms in the East Asian countries and the possible challenges they might create in addressing educational inequality issues. Kwek, Miller and Manzon's Chap. 7 on Singapore is the only exception, as it points to the paradoxical effect on equity of Singapore's differentiated 'bridges and ladders' model.

What needs to be explored in East Asian education are possible contradictions generated in the pursuit of excellence and equity in the traditionally standardised education systems. We need to ask which elements of standardised education systems contribute to overall educational excellence and equity and which are more likely to produce suppressive effects of standardisation on teachers and children and thus are in need of more differentiation and flexibility. This careful discerning effort is important because standardised education systems can have contradictory effects. While standardised systems can make quality education universally available to all students and thus help narrow the achievement gap, it can also erode teachers' professional autonomy and schools' initiatives and hinder the provision of education that better meets specific needs of students and communities. Vice versa, while highly decentralised and diversified systems are likely to better cater to different student needs and interests, they could leave too much to local capacities of municipalities, schools and individual teachers, which could result in more differentiated quality of education provision, widening educational outcomes. This concern is particularly relevant today in East Asian countries and cities where economic disparities have been on steady increase for the last few decades.

Furthermore, the increasing curricular shift towards the generic capability model—as in PISA's 'key competencies' or the so-called twenty-first-century skills and knowledge—in these East Asian countries could present a new kind of inequality challenges in education (see Takayama, 2013, for more details). Leading Japanese sociologist of education Yuki Honda (2005), noting the particular features of 'generic capabilities' and 'key competencies', characterises them as 'postmodern capacity' (*posuto kindaigata nouryoku*): innovation, reflection, creativity, self-motivation and communication and problem-solving skills. Honda contrasts 'postmodern capacity' with what she calls 'modern-type ability' (*kindai gata nouryoku*): the efficient acquisition and demonstration of prescribed knowledge and skills in an artificial, as opposed to real-life, circumstance. This shift in the nature of what children are to develop/what schools are to assess marks a radical change in the way meritocracy—one of the key organising principles of modern education systems—is structured in East Asian education systems, according to Honda (2005).

As discussed earlier, under the modern conception of academic ability, the principle of meritocracy was structured around the standardised assessments of a set of prescribed knowledge and skills. The procedural fairness was maintained by assessing students' 'merits' on the basis of their acquisition of artificially decontextualised knowledge and skills, hence rendering standardised testing 'objective'. By contrast, the imbedding of the postmodern conception of capacity such as key competencies in East Asian education systems can result in what Honda (2005) calls 'hyper meritocracy', 'a more purified and intensified' and 'more predatory form of meritocracy' (pp. 20–21). In the emerging late modern education system, the principle of meritocracy is increasingly structured around the 'functional potentials' of individuals; students are to be assessed in terms of their ability to accomplish a given task in a concrete, real-life circumstance or what she calls 'individual merit in the truer sense of the term' (p. 21).

Honda (2005) further argues that the late modern education system no longer preserves the procedural fairness of the modern education system. This is because the assessment of students' attitudes, motivations, values and dispositions is considerably more implicit and subjective; it is likely that teachers' assessment of students' use of these 'psychosocial resources' is influenced by the teacher–student 'fit' in their socio-economic-based ways of knowing and being, 'habitus' (Bourdieu, 1984). Furthermore, the opportunity to acquire the desired values, attitudes and motivations can never be equally distributed to all students because those psychosocial resources are 'tacitly acquired in informal interactions' in families and communities (Bernstein, 2000, p. 42) and because they are more likely to be developed through the 'quality' parent–child interactions and communications in families of higher socio-economic background (Bernstein, 2000, 2003; Honda, 2005; Lim, 2013).

This creates a serious policy predicament for East Asian governments striving to achieve educational equity and excellence. For the extensive state intervention into the private domain of children's family and community life is the corollary of the egalitarian policy intent in the late modern social context. To put it differently, as East Asian education systems move towards the generic capability mode, it pushes the locus of their policy intervention outside the sphere of their direct policy influence—schools—into communities and families, the domains over which the liberal-democratic states have traditionally exercised limited policy influence. As Leonel Lim (2013) rightly points out, the similar change in the Singaporean education system will require lower social class parents to 'be re-socialised or to be kept out of the way' (p. 11). Hence, it could 'add to the educational advantages already afforded to advantaged groups in society, leaving instead working-class families further removed from the instrumental and moral orders of the school' (Lim, 2013, p. 11).

To address this emerging equity challenge, the East Asian governments might extend their locus of policy intervention to children's family and community life. Such an invasive policy initiative has been introduced in Japan, for instance, where the national assessment, which collects extensive data on children's home and community life in addition to their academic performance data, has been used as a lever to direct attention to the quality of children's life outside schools (Takayama, 2013). The Japanese case epitomises the paradoxical consequence of equity-focused policy intervention in the era of hyper meritocracy; what used to be considered beyond state policy influence is now increasingly brought under the state regulatory and monitoring gazes, and schools are mobilised to operationalise them. The efficacy of this invasive intervention into family and community relations is highly questionable, especially when socio-economic disparity is widening in East Asian countries and economies. The narrow focus on improving family and community relations without due regard to the structural causes of inequality is likely to privatise the latter and naturalise the demonisation of poor families and communities.

However, if East Asian states still persist—despite these policy predicaments it necessarily entails—with the notion of generic capabilities as the key strategy to prepare children for emerging knowledge economy, then deeper understanding of this new idea might help them devise alternative approaches to containing its inequitable consequences. Little recognised by East Asian policy actors about

OECD's notion of key competencies, for instance, is its radical de-schooling impulse. As those who were involved in the developing of OECD's key competencies explicitly state, key competencies are 'result of education in general terms and not only of schooling' (Tiana, 2004, p. 48). In particular, the noncognitive aspects of key competencies—'practical skills, attitudes, motivation and values … are not necessarily or exclusively acquired and developed in the domain of formal education' (Gonczi, 2006, p. 113; Rychen, 2009, p. 2573). Clearly, these developers of key competencies take a lifelong and lifewide approach to the conceptualisation of key competencies, positing formal schooling as just one of many domains where children's key competencies are to be developed (see Takayama, 2013).

This suggests that East Asian education systems, keen to integrate the generic capability model as the guiding principle for curriculum reform, must start rethinking the roles and responsibilities of a wide range of partners across the whole society—families, communities, voluntary associations, cultural and religious organisations, schools, workplaces and governments (Gonczi, 2006; Rychen & Salganik, 2000; Tiana, 2004). While it is sensible to direct teachers' and schools' efforts towards equipping students with noncognitive skills and dispositions as suggested by Lim (2013), it is equally important to embrace the notion of lifelong and lifewide learning and recognise the limits of what formal schooling can achieve in this regard. As discussed earlier, the universalisation of primary and secondary education was the most important mechanism for achieving educational excellence and equity and, by extension, meeting the states' human resource development needs under the J-model. However, this premise about schooling itself might have to be rethought if the East Asian states are prepared to leave behind the J-model and adopt the new logic of educational meritocracy, which the introduction of generic capabilities such as OECD's key competencies, necessarily entails.

In sum, East Asian education systems today are in the midst of a radical systemic shift towards a new model of education system that is supposedly more suited for knowledge economy and late modernity. And this change is confronting them with the new policy predicaments around how to achieve equity and excellence in education. I have shown that these challenges can only be adequately grasped when the 'old' model that East Asian systems are leaving behind—including its imbedded logic of meritocracy—and the implications of this shift are carefully examined. Further understanding of the 'East Asian problems' identified above requires more dialogue and comparative analyses of education among those who research education systems in the region, the focus of my next discussion.

'Asia as Method'

The causes for the inequality challenges identified above are obviously numerous and complex, but I argue below that these problems derive, at least partly, from what Kuan-Hsing Chen (2010) calls 'the West as method', which 'has become the dominant condition of knowledge production' in East Asia (p. 216). According to

Chen (2010), East Asian nations are caught in the legacy of the post-war US hegemony in the region and the postcolonial infatuation with the West as the single source of modernity. They continue to perceive the USA, and the 'West' by extension, as the yardstick of modernity, constantly viewing reform models drawn from them as the source of inspiration and innovation. In education policy, this pattern of policy learning remains shaped by the historical, geopolitical conditions or what Sung and Lee (2017) call, after Raymond Williams, 'the structure of feeling' (p. 174) constituted through the powerful roles that the USA has played geopolitically, economically and culturally in the region.

The incessant comparison of Asian self and social conditions with what is putatively Western or American has naturalised the unequal division of intellectual labour; the former serves as a location of particularity where data is mined, while the latter as a location of universality where theory is produced. This has rendered more useful ways of understanding East Asian self and social conditions, according to Chen (2010). As a way to transcend the problem of the 'West as method', Chen advocates the notion of 'Asia as method': the use of Asia as an imaginary anchoring point within which Asian scholars use each other's experiences as the key point of reference:

> using the idea of Asia as an imaginary anchoring point, societies in Asia can become each other's points of reference, so that the understanding of the self may be transformed, and subjectivity rebuilt. On this basis, the diverse historical experiences and rich social practices of Asia may be mobilised to provide alternative horizons and perspectives. (p. 212)

Hence, 'Asia as method' is a way of 'multiply(ing) frames of reference in our subjectivity and worldview; so that our anxiety over the West can be diluted…' (p. 223). What Chen calls the 'inter-referencing mode of analysis' in Asia encourages Asian scholars and activists to use each other as a point of reference, so that 'the sources of our readings' are multiplied 'to include those produced in other parts of Asia' (p. 255).

Chen's critique seems relevant to the way standardised education systems are dismissed by East Asian education scholars and policy makers as suggested by Park (2013; see also Takayama, 2017). Indeed, education reform debates in East Asia are shaped by the incessant comparison between American or British theories (ideals) and Asian particularities in education. Underpinning the East Asian education reform aimed to develop students' individuality, creativity, problem-solving and entrepreneurship is the implicit assumption that 'we are lagging behind Western education systems where these desired attributes and capabilities are more effectively developed'. Chinese reformers lament that their standardised education system will never be able to produce Steve Jobs and Bill Gates nor Nobel Prize winners (Zhao & Meyer, 2013; Zhao, 2014). Yong Zhao (2014) goes as far as to point to the inverse correlation between standardised testing and students' creativity and entrepreneurship, hence cautioning Western countries that now look to East Asian education as their reform model (see Zhao, 2014). Indeed, such a dismissive view is widely accepted by researchers and policy makers in many East Asian PISA high-performing countries. They downplay their exceptional performances and argue that their countries and cities achieved PISA top ranks for 'wrong reasons'

(e.g. due to students' familiarity with standardised testing similar to PISA and intense academic pressure, etc.) (see Forestier & Crossley, 2015; Takayama, Waldow, & Sung, 2013; Waldow et al., 2014).

What is possibly demonstrated here is an internalisation of negativities about their own standardised education systems; their 'deficiencies' are constantly invoked through a simplistic contrast with the often-idealised representation of the decentralised, diversified and flexible UK or US education system or the 'best practices' proffered by OECD. Ironically, such a dismissive view of East Asian education, promoted by East Asian scholars, is further reinforced by education pundits and researchers in Australia, the UK and the USA, where prominent political figures call for learning from East. In an attempt to counter their highly politicised use of East Asian success, these critics draw on East Asian researchers and policy actors' negative self-perceptions of their education systems, and they together perpetuate a stereotypical characterisation of East Asian education as dominated by rote learning, didactic teaching, testing and intense academic pressure, the view which has been refuted, or at least complicated, by recent studies (see Komatsu & Rappleye, 2017; Takayama, 2017; Tan, 2013), including some of the chapters in this section.[1]

Furthermore, Chen's notion of the 'West as method' also offers valuable insights into East Asian states' rather blind adherence to the so-called 'international' trends of education policy. While East Asian states' desire to 'import international experiences into its educational reforms' (see Zhu and Deng's Chap. 3) is certainly laudable, yet it must be pointed out that the notion of 'international' here seems largely skewed towards particular parts of the world, namely, Anglo-American countries, select European countries and the supranational organisations such as the European Union, OECD and World Bank whose educational agendas are largely shaped by researchers and policy actors from these countries. Hence, blind belief in 'international' trends can be construed as a form of 'West as method' where 'solutions' to the problems at home are constantly sourced from elsewhere and in the process particular institutional contexts of East Asia might not be fully taken into consideration. One ought to ask, therefore, to what extent the equity implications of the introduction of generic capabilities and key competencies have been considered within the particular institutional context of East Asian education and what strategies have been devised to address the policy predicaments generated as a result of the shifting logic of meritocracy. Chen's argument suggests a need to take a healthy distance from what is construed as 'international consensus' as well as to create an alternative network of education policy actors and researchers that centre more squarely in East Asia wherein policy challenges that are particular to East Asia can be debated.

In this regard, it is notable how little the five chapters in this section refer to scholarly sources produced by other Asian scholars. All of the authors build on the scholarship produced in the given country under discussion, while drawing

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[1] See how Zhao's work has been taken up by Diane Ravitch (2014), who was critical of the way the Obama Administration called for learning from the East in the immediate aftermath of East Asian PISA success.

extensively on English language scholarly sources produced primarily by UK- and US-based researchers. One notable exception is Sugimura's Chap. 6 whose references are almost exclusively from Japanese-language sources written by Japanese scholars. Some of the authors clearly engage in the 'West as method', using the English-language scholarship, produced in the UK and the USA, to either frame the discussion of the issues in their respective East Asian contexts or use it as an implicit point of comparison through which the problems of East Asian education systems are framed. For instance, Poon-Mcbrayer's Chap. 5 shows not only that many of the equity-based intervention strategies in Hong Kong have been imported from the USA. But her writing implicitly uses US-based scholarship and US inclusive education legal frameworks as the implicit 'model' from which Hong Kong is to learn. Likewise, Kwek, Miller and Manzon's Chap. 7 on Singapore draws extensively on US and UK-based education research on educational inequalities as well as Nancy Fraser's theoretical work on the three notions of social justice (recognition, redistribution and representation). One has to question to what extent Fraser's work are applicable to and meaningful for the discussion of educational equity in Singapore and East Asia and what has been made invisible as a result of the 'West as method' approach. This is not a call for politics of postcolonial resentment but for a thoughtful and critical engagement with existing theoretical constructs that have emerged out of a particular socio-political and historical context rather different from East Asia. The dissonance between Fraser's theoretical construct and the empirical reality in Singapore, which remains unarticulated in Kwek, Miller and Manzon's Chap. 7, could have been more carefully explored so that the former's limits, or its provinciality, could have been acknowledged. Apart from passing references in the Hong Kong chapter to the Singapore education system, none of the other chapters made any reference to other East Asian scholarship and policy situations.

Towards East Asian Dialogue

In bringing together the subsequent five chapters, I have attempted to reframe their country-specific accounts of educational policy issues around excellence and equity from the regional, East Asian perspective. In so doing, I have identified some of the critical equity issues faced by East Asian education systems today which can only be understood when the shared institutional features of East Asian education systems are recognised. While such a regionally-based analysis inevitably glosses over many of the important historical, institutional and sociocultural differences among East Asian education systems, it has enabled us to identify the key institutional features of East Asian education systems (e.g. J-model) and to examine how the recently introduced changes could generate a set of new educational inequality concerns in East Asia. Furthermore, drawing on Chen's work, I have accounted for the lack of attention to the shared historical experience and to the common equity challenges in East Asia in terms of the problem of the 'West as method'; the default

mode of self-analyses in East Asia is to identify problems of their own education systems through explicit and implicit comparisons with 'innovative' programmes and policies in the 'West' or the so-called international consensus. To move beyond this postcolonial infatuation with the 'West' as the single source of inspiration and imagination, Chen's notion of 'Asia as method' was proposed to develop a more useful way of understanding the current state of education and its future equity challenges in East Asia.

To put in practice the idea of 'Asia as method' in education scholarship, more researchers need to use each other's experiences and texts in understanding their own educational issues that are uniquely articulated in East Asia. This section of the book, composed of five chapters detailing Hong Kong, Shanghai, Taiwan, Singapore and Japan's policy initiatives in striving towards both educational excellence and equity, should be viewed as part of the nascent effort, among researchers studying education policy in East Asian countries, to initiate a regional dialogue, including the recent volume, *Globalisation, Changing Demographics, and Educational Challenges in East Asia*, edited by Hannum, Park, and Goto-Butler (2010). I agree with these editors that a regional perspective is much needed in East Asia where there exist 'little cross-fertilisation among scholars of education working in different East Asian nations and little research cataloguing commonalities and disparities in educational policies and outcomes' (Hannum et al., 2010, p. 2). In this chapter, however, I have attempted to push this agenda of East Asian dialogue a step further by actually showing how the regional perspective is a fundamental part of understanding the emerging inequality challenges faced by East Asia education systems. It is my sincere hope that these five chapters, along with my 'synthesis' work presented here, will facilitate the inter-referencing mode of analysis among scholars researching East Asian education systems. More East Asian dialogue is needed to work out effective strategies to manage the policy challenges of equity and excellence, particularly when systemic changes have created (or are about to create) similar equity problems in education across the region.

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Chapter 3
Education Reform in Shanghai in the Era of Globalisation: Towards a Balanced and Innovative System?

Zhiyong Zhu and Meng Deng

Introduction

Over the past three decades, the international community has witnessed China's increasing integration into the global economy and dramatic changes to every aspect of its social life (Postiglione, 2006). Shanghai, as the largest metropolis and economic centre in China, has been widely expected to play a leading role in the modernisation process of the national economy and technological innovation. As early as the 1990s, the Shanghai government set the goal of establishing itself as a global city and in its 10th Five-Year Plan (2001–2005), declared its aim to become a centre of international commerce, finance, trade and shipping by 2020 (Leman, 2002). The Central Committee of the Chinese Communist Party, a dominant force in the governance of China, encouraged Shanghai to play a prominent role 'leading to change the mode of economic growth, leading to improve the capability of independent innovation, leading to promote reform and opening to the world, and leading to building a harmonious socialist society' (Xinhua News, 2007). To realise these goals, the Shanghai Municipal Government (2006) advocated development of innovation to enhance the international competitiveness of the city and the use of science and education as the major strategy to achieve development of the city.

This chapter analyses Shanghai's reforms against the backdrop of Chinese social changes and discusses the underlying tensions that Shanghai encounters in defining the role of local education in an increasingly globalised Chinese society. We identify two orientations of the reform measures: promoting balanced educational provisions and seeking innovations to enhance educational quality. The paper concludes that educational reformers in Shanghai must strike a balance between manifold understandings of education in international and Chinese society, mediating between cultural values as well as political and economic benefits.

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Shanghai's Education: Historical Development and Debate

Shanghai's educational reforms provide a lens for us to understand the interplay between the political, economic and sociocultural forces that shape the schooling system in China. Of note is the huge disparity in the levels of educational development between different regions within China. According to a comparative study of 31 provincial-level administrative units between 1997 and 2010 (Liu, Tan, & Tian, 2013), the levels of indicators of GDP per capita, per-pupil educational expenditures in the budget, student–teacher ratios and the attainment of higher education are higher in Shanghai and Beijing than in other regions in China. Compared with other cities and areas, Shanghai displays some special features. Prior to the establishment of the communist regime in 1949, modern education had already been well developed in Shanghai, and a diversified schooling system had emerged at that time, which included a large number of private and religious schools (Fu, 2007). Shanghai also built its reputation as an education hub during that period, particularly at the tertiary education level. A substantial number of institutions of higher education, including comprehensive universities, were established, and some were highly influential in the country (see Hayhoe, 1989). With the socioeconomic reforms that have occurred in China since the beginning of the 1980s, Shanghai enjoys a relatively high degree of autonomy in initiating new measures to break through traditional constraints. It is one of the four provincial-level municipalities (the other three are Beijing, Tianjin and Chongqing), and one of the most developed areas in China, and has a relatively high degree of urbanisation. Under communist rule, Shanghai continues to hold an advantage in the level of higher education. There are 67 public institutions of higher education, including the 4 most prestigious. There are also 985-project universities in Shanghai, more than in most other Chinese cities and even the provinces[1]. This includes one of the best universities for training teachers in China.

Some effort has been made to study Shanghai's education system, including a systematic analysis of the reasons for Shanghai's educational achievement in the PISA (Cheng, 2011; Tan, 2011, 2012, 2013; Zhang & Kong, 2012): how Shanghai's performance imposes an influence upon other nations in educational policy (Sellar & Lingard, 2013; Tucker, 2011) and China's internal voices from educational researchers, local education authorities and media regarding its success in the PISA (Zhang & Akbik, 2012). Traditional cultural values and the global economic system are widely regarded as important forces shaping Shanghai's schooling system (Carney, 2009). Yet, other scholars such as Bai (2010) argue that China's education

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[1] There are altogether 2553 regular colleges and universities in Mainland China in 2015, not including 292 adult higher education institutions (retrieved from www.moe.gov.cn/srcsite/A03/moe_634/201505/t20150521_189479.html). Since the beginning of twenty-first century, the central government has initiated the programme of 211-project and 985-project universities, the former including 114 universities (retrieved from www.eol.cn/html/g/gxmd/211.shtml) and the latter 39 ones which are selected from the former ones (retrieved from www.eol.cn/html/g/gxmd/985.shtml) (also cited from Han & Zhu, 2015, forthcoming).

system is complex, and other forces, such as neo-Confucianism and the thought of humanism originating from Renaissance Europe, also exert a profound influence. Deng and Zhao (2014) argue that Shanghai's recent educational reforms integrate three features of education (selection, justice, and independence) in its own manner, but education as a channel for realising justice always plays a central role in the changes. Zhang, Xu and Sun (2014) specifically analyse teachers' training and professional development programmes in Shanghai and argue for the role of 'a high-quality teaching force' (p. 144) in ensuring the success of its educational system.

After reviewing the historical development of the Shanghai education system and the recent intellectual debates on it, we will discuss two specific orientations to construct a more detailed picture of education reforms in Shanghai under globalisation.

Construction of a Balanced and Equitable Education System

According to an analysis of Shanghai's performance data in the 2009 PISA, Lu (2013), the performance of rural students in reading, mathematics and science lagged significantly behind that of their counterparts in urban areas, and the achievements of the first generation of Shanghai students in the three subjects were also significantly lower than those of the second generation. Migrant workers, who constitute a majority of the first generation of Shanghai people, suffer poverty and discrimination and are also largely deprived of the chance to enjoy the benefits of social welfare relating to local residence and access to public schools (Hu & Szente, 2010). This section will discuss the educational challenges in Shanghai in constructing a balanced and equitable education system. We shall focus on the distribution of educational resources between different regions and types of schools and also two prominent vulnerable groups, immigrant children and children with special needs.

Balancing the Distribution of Educational Resources

There are some long-standing disparities in China's education field, and Shanghai is not an exception. For example, rural and urban differences, widely considered one of China's most pronounced social disparities, have been enlarged in education and related resource allocations (Postiglione, 2006). Likewise, in Shanghai, the allocation of educational resources and quality of education differ significantly between urban and rural residents (Lin, Zhang, & Shi, 2009). Shanghai was among the first cities to achieve universal primary and junior secondary education with an enrolment above 99.9%, in response to the Compulsory Education Law of the Peoples' Republic of China 1986. It was also among the first to achieve near universal senior secondary education with an enrolment above 97% (OECD, 2011).

Beginning in 2006, Shanghai initiated a regular funding safeguard system for compulsory education for all students and established a waiver programme for tuition and miscellaneous fees (Duan, 2013). In addition, the government made use of transfer payments and set up special funds to rebalance resource allocation between urban and rural education. The strategies were used to transfer educational resources from urban centres to the rural suburbs. Examples include strengthening the collaboration between urban and rural schools through experience-sharing and encouraging urban schools to take over the administration of poor rural schools and implant the urban model of school management and pedagogy directly into them. Additionally, prestigious urban high schools were encouraged to set up branch campuses in rural areas to provide educational opportunities to rural students (Ibid).

The distinction between key schools and ordinary schools offers another example. The so-called key schools, originating in the early 1950s, were given advantages in teacher quality and training, financial resources and equipment, and, unsurprisingly, graduates of key schools were more likely to enrol in college (Lin, 1999). This phenomenon resulted from a historical stereotype of elite education and inadequate educational resources to meet the needs of parents and students, compounded by large regional and rural-urban disparities (Zhou & Han, 2010). In 1994, Shanghai was among the first cities to implement a policy of neighbourhood attendance during the compulsory schooling to abolish the practice of the key school system (OECD, 2011). The policy of neighbourhood attendance, both in Shanghai and other areas of China, nevertheless, had a limited impact on the situation, as students could choose schools in other neighbourhoods by paying a sponsorship fee. Unsurprisingly, wealthy parents or those with higher social status and greater social capital were more successful in enrolling their children at better schools (Liu, 2011). Based on the data of PISA in 2009, it was found that the schools privileged by student family background possessed greater high-quality educational resources than their counterparts, and the public resources were allocated unequally among different schools (SEPAC & SAES, 2013, p. 1). In 2013, the Shanghai government made another pioneering change: prohibiting public high schools from charging the sponsorship fee (Liu, 2011). It remains an interesting question whether Shanghai's series of policy changes can narrow the gap between different types of schools. However, it can be perceived from these policies that the Shanghai government changed 'its orientation of evaluating educational efficiency from scores indicators, material accountancy, and instrumentalism value into students' overall development, school improvement, and humanistic value of education while advancing equal and balanced educational development' (SEPAC & SAES, 2013, p. 113).

Strengthening Education for Migrant Children

Despite their immense contribution to China's economic growth and urbanisation process, rural migrant workers do not enjoy the same rights and benefits as urban citizens. The floating population of migrant workers often faces challenges including

social discrimination and poverty, as well as exclusion from the urban social security and household registration systems (Hu & Szente, 2010). The Sixth National Population Census 2010 indicated that there were over seven million migrant workers, and their children occupied over one fourth of the entire student population at the primary and junior secondary level in China (Tan & Chen, 2012). Migrant children experience difficulties with access to public education, which has become a major national issue that the government pledges to deal with in many significant policies including *The Medium- and Long-Term Outline on Educational Reform and Development (2010–2020)* (State Council of China, 2010).

Shanghai has been a major destination for migrant workers in recent decades, and its government was among the first to develop initiatives to deal with migrant education (OECD, 2011). In 1997, Shanghai's migrant population was an estimated 2.35 million, around one-sixth of the registered population (Zhu, 2001). In response to public concerns about education for migrant children, Shanghai adopted two methods to ensure migrant children's access to education according to the national policy known as the 'Two Main' (the host city takes the main responsibility in educating migrant children, and migrant children should be educated mainly in public schools) (Jie, 2010). The first effort was to make public schools accessible to migrant children. Gradually, the education authorities of subordinate districts and counties were required to make specific plans to increase enrolment of migrant children steadily after negotiating with migrant organisations and other relevant parties. The second was to include private schools into the official supervision and improve the quality of education for migrant children.

The number of private schools started to increase after the mid-1990s to meet the demand of affordable education for migrant children in cities. These schools charged a much lower tuition fee to migrant families as compared to local public schools, and the majority operated illegally without meeting basic standards, including the minimum health and safety requirements set forth by local education authorities. Private schools provide more opportunities for migrant children often rejected by public schools for various reasons, mainly, the absence of a residence permit (Hu & Szente, 2010). Since 2008, Shanghai's government has supported and supervised the operation of private schools to educate migrant children and offers financial support to some private schools (Yu & Zhang, 2009). The Shanghai Municipal Education Commission (SMEC) (2008) published a specific policy document *Regulation on Improving Compulsory Education for Migrant Children in Shanghai* to regulate migrant education. Consequently, private schools have been increasingly encouraged by the government to provide free education to migrant children. In 2010, over 420,000 migrant children were enrolled in free compulsory education in either local public or private schools in Shanghai (Jie, 2010). Based on multiple migrants from inside and outside China and educational internationalisation and globalisation, the Shanghai government set up the 'educational opening strategies[2]' since 2010 (SEPAC & SAES, 2014, p. 3).

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[2] The educational opening strategies include the opening to the Yangtze River Delta region, which aims to be linked with the regional economic and social development and to strengthen the regional

Improving Education for Children with Disabilities

Special education provisions for children with disabilities were seen as the weakest part of the Chinese compulsory education initiative (Deng & Holdsworth, 2007). By 1988, less than 7% of about eight million children with disabilities were enrolled in school. Recently, priority has been given to providing school access to a large number of children with disabilities previously denied education, through schools especially for children with disabilities or inclusive education programmes (Xiao, 2007). However, special education has mainly targeted children with three basic disability conditions, referred to as intellectual disabilities, hearing impairments and visual impairments. Other disabilities (e.g. learning disabilities, severe physical disabilities, multiple disabilities, psychiatric disabilities) commonly catered to in Western countries are not recognised by society or not served by the school system due to resource constraints (Deng & Guo, 2007).

Shanghai has made effort to develop special education to show Shanghai's progress in social civilisation and the government's ability to provide public service. First, during the 10th Five-Year Plan period (2001–2005), Shanghai's government included special education in the city's overall education plan for development and invested public dollars to renovate all 29 schools designated as schools for children with disabilities (Department of Educational Technique and Equipment in Shanghai, 2009). Teaching and rehabilitation equipment was provided to these schools according to the 2007 official standards for special schools, and special living subsidies were offered to students with disabilities from families in poverty (Department of Educational Technique and Equipment in Shanghai, 2009).

Second, Shanghai extended special education services from the aforementioned three basic disability conditions (visual impairments, hearing impairments and intellectual disabilities) to include disability categories of autism, cerebral palsy and multiple disabilities, under the slogan 'never give up even one child' (Jie, 2010). In the *12th Five-Year Plan (2011–2015) for Basic Education Development*, a directive issued by the SMEC (2011), the municipal government advocated to extend education for students with disabilities into preschool and high school education systematically to complete a holistic special education system. Similarly, the Shanghai *Medium- and Long-Term Outline on Educational Reform and Development (2010–2020)* (the Shanghai *Outline* hereafter) stipulated that a balanced special education from preschool to higher education should be formed by 2020 to better meet the educational needs of students with disabilities (Shanghai Municipal Government, 2010).

Third, Shanghai developed a structured special education service model, taking the special schools as the 'backbone', special classes attached to regular schools and

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educational collaboration and to advance mutual development; the opening to society, which means to break through the school campus and absorb more social resources, to enhance service function and to cultivate more talents fit with the social development and requirement; and the opening to the world, which heightens to improve international educational cooperation, to share developmental experiences and to facilitate educational change and innovation (SEPAC & SAES, 2014, pp. 3–19).

inclusive education as the 'body', while supplementing these with 'home schooling' and community education. It was advocated that a support system be developed at city and district (county) levels, referred to as 'Resource Centers for Special Education', to guide inclusive education programmes. Local schools experimented with a specific teaching methodology called 'integration of medical and educational models' (Jie, 2010). Local educators and researchers disseminate the achievement of the experiments nationwide as a distinct educational innovation in Shanghai.

Development of an Innovative Education System with High Quality

After reviewing key measures to promote a balanced and equal educational system, this section will focus on another orientation in Shanghai's education reform, to pioneer the reforms and innovation of the education system responding to global challenges. The Shanghai government set the goal of building up a first-class education system in harmony with the strategic goal of developing an international city in the early 1990s. This goal is stated more comprehensively in the Shanghai *Outline*, which advocates the targets of meeting the needs of all learners, promoting the quality of education and cultivating innovative talents for the country in response to global competition (Shanghai Municipal Government, 2010). This directive also announced the exploration of a new education system characterised by lifelong education and development, promoting the combination of education, research and industry and strengthening educational services for economic and social development in Shanghai and nationwide. In this section, we will discuss the innovative changes that Shanghai has made in three areas: public examinations, the school curriculum and pedagogy and international collaboration.

Innovation on the Examination System

Examinations have long been a challenging issue in China in any attempt to reform education, since the overreliance on examinations to select elites jeopardises the genuine development of creativity and personality of young people (OECD, 2011). The emphasis on examinations derives from the imperial examination system, designed to select the best officials for governing society by the imperial central authority. This system survived for centuries to form a highly competitive education tradition of elitism in China (Feng, 1995). The examinations aroused intense competitions among parents, teachers, students and schools for the limited quota of university places, and an extreme examination-oriented education system was formed, valuing test scores and neglecting actual ability and personality development (Ibid).

China began to expand the scale and quality of higher education in the late 1990s to meet the challenges of the twenty-first century, which had immense implications for the entire education system, including examinations. In Shanghai, both the government and the public called for reforms toward a more quality-oriented education system on the enrolment and examination system, demonstrated by the proposed new core educational idea 'education for the life-long development for every student,' in the Shanghai Outline (SEPAC & SAES, 2013, p. 46). As early as 1985, Shanghai was encouraged by the central government to lead the reform on the examination system and thus was allowed to organise college entrance examinations under its own jurisdiction (OECD, 2011). The major changes include banning selective entrance tests for school enrolment at primary and junior secondary level and allowing students to attend neighbouring schools free of charge. Schools were required to adopt to a comprehensive evaluation system (combining examination scores, overall development quality, interviews and students' school choices) and recommendation mechanism to enrol students at the high school level (Wang, 2004). For higher education, the admission policy is moving toward a more diverse and flexible system in which universities and colleges enjoy greater autonomy in admitting students (Li, 2013).

All reforms of the examination system tend to be oriented toward reducing students' workload and targeting more comprehensive and balanced learning experiences with the goal of developing the whole person. The Shanghai *Outline* regulated that a new admission and examination system should be developed to cater to the trend of the universalisation of higher education (Shanghai Municipal Government, 2010). Many significant changes have taken place, including allowing high school graduates to take college entrance examinations many times, instead of the previous regulations under which students could only attend the test once; diversifying the methods of evaluation; and expanding students' choices and the universities' autonomy in admitting students independently (Shanghai Municipal Government, 2010). However, reforming admission at the tertiary level is complicated because it not only involves complex interactions between the central and local governments but is also viewed by many Chinese as an issue of social equality (Li, 2013).

Reform on Curriculum and Teaching

Shanghai played a pioneering role in leading the latest round of national curriculum reform endorsed by the Chinese central government in 1999, which aims to replace repetitive and mechanistic rote-learning with innovative, participatory learning experiences (Feng, 2006). Shanghai's curriculum reform was guided by a 'students development-oriented' philosophy to promote the goal of quality education for all. Beginning in 2009, the SMEC initiated a new round of curriculum reform and chose four districts or counties to 'strengthen curriculum reform, promote quality-oriented education and enhance schools' specialised development' each semester in turns, by implementing individualised reform methods (Duan, 2013). The curriculum reform

emphasises active and constructive learning, as opposed to the traditional passive learning style, relying on memorisation and regurgitation (Jiang, 2009). Compared with the past, the curriculum is becoming much more diversified, and students can learn the national, local and school-based curricula at the same time. The teaching methods promoted by the new curriculum encourage students to take part in various well-designed learning contexts and experience cooperative and inquiry-based learning activities (Duan, 2013).

This shift in curriculum resulted in enormous changes throughout the entire educational system. Many high schools thus made efforts to provide diverse and flexible curricula to enhance communication between teachers and students and inspire students' creativity and learning interests. For example, high schools such as Shanghai High School, No. 2, attached to East China Normal University, initiated the 'Experimental Project on Cultivating Talents with Creativities' and tried to collaborate with higher education institutions to develop more integrated and enriched curricula (Ibid).

The notion of 'life education' is embraced by the Shanghai government in the curriculum reform and emphasises students' comprehensive development in different domains (SMEC, 2011). The Shanghai *Outline* stipulates that ongoing curriculum reform should be directed to the goal of 'lifelong development for every student', and the major task is to improve the curriculum system and reform teaching methodology, to develop students' interests, creativity, independent thinking and cooperation in the process of compulsory education. High schools should provide 'high-quality, flexible, diverse and specialised' curricula to students to enhance their humanistic and scientific literacy, creativity and world views and values, so as to lay a solid foundation for students' future success (Shanghai Municipal Government, 2010).

Different types of international curricula have been introduced to high schools in Shanghai since the beginning of the twenty-first century. These include the IB curriculum by International Baccalaureate Organization, A-Level Curriculum from the UK, AP Curriculum from the USA, High School Curriculum from France and Germany and so on. For example, in 2012, 33 high schools initiated 18 international curricula or ones from foreign countries (SEPAC & SAES, 2014, p. 163). In addition, teaching methodologies attached importance to inquiry-based learning and experimental practice. The Shanghai government aimed to internationalise the teachers at different levels. For example, in 2012, 885 teachers from higher education institutions were awarded visiting scholarships in different foreign colleges and universities, 5 teachers from basic education schools were dispatched to the countries for scholarly visits, and 20 school principals and 20 teachers participated in 'Shadow Principals' and 'Shadow Teachers' Programmes in California (Ibid, p. 168). These ideas are an attempt to break through the traditional educational system and actively echo the educational trends in the international community. While the curriculum and pedagogy experience fundamental changes, there are increasing concerns regarding the teachers themselves. Recent research has shown that teachers actually do not enjoy a high degree of professional autonomy in their work (Lai & Lo, 2007; Wong, 2012). This relates to not only their professional development but also the further relaxation of the state's control over the education sector, including curriculum, teaching staff, and schools.

Responding to Global Challenges: Efforts to Strengthen International Collaboration

As China's most international and open city, Shanghai is expected to take a leading role in importing international experiences into its educational reforms to meet the challenges of global competition (OECD, 2011). The Shanghai government set the goal to build a first-class education system in harmony with the strategic goal of developing an international city in the early 1990s. This goal is stated more comprehensively in the Shanghai *Outline*, which advocates the targets of meeting the needs of all learners, promoting quality of education and cultivating innovative talents for the country in response to global competition (Shanghai Municipal Government, 2010). One of the particular goals for education reform has been to enhance international communication and collaboration, to promote Shanghai's propensity for international competition in the arena of education.

The Shanghai *Outline* wrote a full chapter to regulate Shanghai's internationalisation of education and recommended a series of strategies to develop students' abilities for international communication, understanding, collaboration and competition (Shanghai Municipal Government, 2010). The strategies include importing international curriculum and personnel, strengthening foreign language teaching and developing various partnership programmes. By 2010, over 6000 foreign students were studying in Shanghai, and 30% were in undergraduate or postgraduate programmes (SMEC, 2011). Ten Confucius Institutes have been developed overseas with the cooperation of the Shanghai city government; and collaboration programmes between top universities in Shanghai, and their overseas counterparts are growing steadily (Ibid).

Recently, an increasing number of overseas universities have established different forms of collaboration in Shanghai. For example, in 2006, the University of Michigan-Shanghai Jiao Tong University Joint Institute was set up to form a new personnel training system of internationalisation and innovation based on the rules of mutual employment of professors, mutual recognition of credits, curriculum-sharing and mutual awarding of degrees. This new initiative was endorsed by the State Ministry of Education as 'special administrative region of education' to explore successful experiences for wide dissemination (University of Michigan-Shanghai Jiao Tong University Joint Institute Homepage, n.d.). Similar institutes such as the Shanghai-New York University cooperated with New York University and East Normal University, and the Chinese University of Hong Kong, Shenzhen, was also set up to enrol students globally and break through the rigid examination, admission, management and curriculum design of the higher education system in China (SEPAC & SAES, 2014 p. 1; Xinjingbao, 2012).

Apart from reforms at the tertiary level, the Shanghai government also proposed to include the content of international understanding into compulsory education curriculum to increase students' international awareness and encouraged local schools to enrol more overseas students to develop culturally inclusive campuses (SMEC, 2007). High schools began to include international curriculum modules

and encouraged collaboration with overseas partner schools for mutual exchanges of students and teachers. Bilingual and multiple-language instruction has been practised in schools to promote student language abilities with the input of employed overseas staff members.

Discussion and Conclusion

In order to build a modern, global municipal city, Shanghai has made pioneering educational reforms, establishing a model for other regions in China. Based on a review of the major government directives and educational practices over recent decades in Shanghai, this chapter indicates that the local policy rhetoric tends to converge with current trends in international education. The convergence includes the teaching and learning strategies at the micro level, as well as the notions of lifelong education, international education and inclusive education at the macro level. This reflects the social and educational changes in Chinese society, which in recent years joined the international community in realising the importance of overcoming disparity and inequality in education and tried to construct an integrated and balanced structure.

The analysis in this chapter, meanwhile, also suggests multiple tensions as Shanghai's educational reforms are embedded within China's increasingly globalised society. Globalisation raises many complex questions about the conflict and compromise between the local and the global and internal and external conditions (Rizvi & Lingard, 2000). Indeed, globalisation sends differing, even conflicting, messages about the role of education in society, treating education as a public good and human right and emphasising quality education for all, while globalisation favours economic competition, conceiving education as a driving force for developing human resources in a knowledge-based economy. At the same time, the complicated understandings of education in the international community interact with the local Chinese practices under Confucian hierarchical social relations and an elitist educational philosophy (Deng & Guo, 2007). Education is largely considered a selective mechanism to achieve upward social mobility. In this context, social equality does not mean providing the same quality of education for all social members but that the authorities provide an open opportunity for all to compete with each other. As a result, although there is a strong desire and political will to pursue the goal of universal basic education in China after the social and economic reform initiatives of the 1980s, the education system remains extremely examination-oriented with intense competition and is committed to the pursuit for excellence (Zhang & Kong, 2012). The Chinese government has rapidly expanded higher education enrolment since 1999, but the pressure on competition has not alleviated since the focus has shifted from simply attending college to competing for entry into key universities at the national or provincial level, viewed as critical for personal advancement and economic success in China (Yu & Suen, 2005).

The local understanding of education is not simply related to local culture but also to the social structure of China. Shanghai's educational reformers have encountered cultural, social and institutional restrictions while introducing innovations into their school educational system. Although China's entire educational system resembles the government, shifting toward more modernised and professional ways of management and service since the 1980s, the central government in Beijing still maintains powerful control in educational policymaking and resource allocation (Chan & Ngok, 2001; Su & Liu, 2006). This is especially true in the higher education sector, in which the state runs and supervises most universities and colleges around the nation including Shanghai, in particular the prestigious ones. Although the college admission system has sought to move away from an examination-oriented process, the central government is reluctant to abandon its traditional role as a selective mechanism to realise social equality and stability and maintain the control of the party system in larger society (Jiang, 2009; Li, 2013; Liu & Wu, 2006; OECD, 2011). The pressure of college entrance examinations essentially influences the teaching activities in the actual classes and the degree to which the curriculum reforms and other educational innovations can be achieved in reality (Jiang, 2009).

In conclusion, educational reformers in Shanghai must strike a balance between multiple understandings of education in both the international community and Chinese society. This involves resolving the contradictions in the deeply rooted cultural values between different societies, but more importantly reaping economic benefits in the global market, while managing the political tension between the central and local governments. Compared with other cities in China, Shanghai has made incomparable progress in reforming the local educational system. Despite the great progress achieved in building a balanced and innovative educational system, Shanghai may still have a long way to break through the traditional constraints and realise an equal and balanced system. The fundamental challenge is to reconcile the tensions rising between local, national and global levels and negotiate the role of education through balancing its political, economic and cultural needs.

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Chapter 4
How Taiwan Education Pursues Equity in Excellence

Chuing Prudence Chou

Introduction

Like many high-performing counterparts in East Asia, the general public in Taiwan has many concerns related to education, such as excessive pressure from high school and university entrance exams, to name but two. Students suffer intense academic competition as well as the financial burden of after-school tutoring (Chou & Yuan, 2011). Instances of gang members invading campuses, bullying, drug abuse and rule-breaking are increasingly common across the country (MOE, 2011). On the other hand, Taiwanese primary and secondary students regularly win prizes at the International Mathematics and Science Olympiad and rank high in the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS). However, most students do not show much curiosity and interest in exploring science or engaging in reading beyond the classroom (Chou, 2008).

Taiwanese society is still influenced by the Chinese examination tradition which requires a great deal of hard work through drill and practice (Chou, 2014). Taiwan's education system comprises 6 years of elementary school, 3 years each of junior high and senior high school and 4 years at the tertiary level. Compulsory education covered the first 9 years from 1968 and was extended to 12 basic years in 2014. Admission to higher secondary schools has long been a trying period in students' lives because they are required to take examinations to achieve this. This process is repeated again before entrance to universities or colleges. Preparation for entrance exams—the main source of pressure in schools—has prompted much criticism regarding the lack of equal educational opportunities for students from disadvantaged backgrounds.

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Additionally, Taiwan has faced social changes that challenge the pursuit of educational equity in excellence (MOE, 2010b). With the rapid transition to a global society, the Internet has become an important way to reinforce e-learning and promote social agendas amongst students. The arrival of the virtual world and cloud computing has not only provided greater access to information through the Internet but has also resulted in various problems, such as online subcultures. The issue of Internet addiction, a serious concern in Taiwan, has divided parents, teachers and students (MOE, 2011).

Taiwan's demographic composition has transformed into one with a low birth rate and an ageing population. The birth rate has dropped from 410,000 newborn babies in 1981 to 270,000 in 1998, to 191,000 in 2009, with a slight increase to 210,830 in 2014 (RIS, 2013). As a result, many schools are confronted with closure and teacher lay-offs. Some universities, especially private ones, are also in the process of institutional closures or mergers (Hu, 2010). In addition, children of foreign nationality and those for whom one parent is Chinese account for nearly 10% of the total student population and 3% at the lower secondary level in Taiwan (MOE, 2010a, 2011). The population ratio of the elderly will reach nearly 20% in 2025 (Central News Agency, 2015). With such social transitions and challenges, the restructuring of Taiwan's education system is inevitable.

Above all, public alarm has been raised by the increasing polarisation of student learning outcomes and behavioural issues stemming from the uneven distribution of educational resources and teacher retention rates (Cheng, 2011; Lee, 2000). According to Japanese scholar, Ōmae Ken'ichi (1990), the growth of vulnerable social groups whose opportunities are influenced by economic factors or family status is an important reason for the M-shape of educational distribution in a society in which the rich get richer and the poor become poorer. Children who grow up in such environments are usually subjected to poverty and crime owing to the lack of cultural capital and appropriate role models (Katz, Corlyon, La Placa, & Hunter, 2007). As more families disintegrate, and traditional childrearing is transformed, an integrated task force is required to provide support for children at risk (Kuan & Yang, n.d.).

Taiwan also faces the challenge of environmental sustainability. According to 'World Bank Natural Disaster Hotspots—A Global Risk Analysis', Taiwan is one of the areas of the world where natural disasters occur most frequently (Arnold, Dilley, Deichmann, Chen, & Lerner-Lam, 2005). Over the last 10 years, Taiwan had been hit by a series of natural disasters which resulted in unprecedented consequences to educational facilities, especially in the remote regions (MOE, 2009a, b). More education is needed to enhance citizen awareness of global climate change and the coexistence of economic development and environmental sustainability.

In an International Civic and Citizenship Education Study (ICCS) covering 37 countries around the world in 2009, results for Taiwan showed that its 14–15 year-old teenagers scored much lower than the average in trust in national government, political parties, media, schools and people in general (Schulz, Ainley, Fraillon, Kerr, & Losito, 2010). As high-level cross-strait relations and economic cooperation has developed to an unprecedented degree, cultural and educational exchanges have

also increased. Education plays a major role in shaping national identity in Taiwan, and with the ongoing cross-straits cultural and education exchanges, this has become more urgent than before (Chou & Ching, 2015).

In sum, these social changes have created an urgent demand for immediate educational restructuring and transformation so Taiwan can fulfil its mission of equity in excellence. The next section explicates these reforms.

Education Reform for Equity in Excellence

Taiwan education development since the 1990s represents a transition from authoritarian to democratic governance and from a highly centralised administration to government-regulated and market-driven management (Chou & Ching, 2012). With respect to equal educational opportunity at all levels, Taiwan education moved from a highly competitive elite-access model to a more universal orientation and from a single-facet of academic excellence to more recognition and acceptance of diverse talents and social backgrounds (Chou, 2015).

The core of the early 1990s reform initiatives, interwoven with the Master Plan for Education Reform Report from the Education Reform Committee, highlighted the reform principles for Taiwan's future education (Chou & Ching, 2012):

1. Deregulating governmental control over education
2. Exempting education sectors from unrelated regulation and constraints
3. Protecting students' basic learning rights
4. Respecting parental right of choice on education patterns and paths for their children
5. Guaranteeing teachers' professional autonomy and quality

Above all, the proposal for broadening and diversifying admission channels to high school and university was expected to have the greatest impact on facilitating equal educational opportunities. The Ministry of Education (MOE) and related education authorities also initiated a series of legislation reforms in education. Most importantly, the promulgation of the Education Basic Law in 1999 paved the way for promoting student rights and educational equity. In addition, underprivileged students, including those from remote areas, have been given special support to ensure their equal educational opportunities (Wang et al., 2011). In 2013, the Aboriginal Education Law was passed to guarantee equal educational opportunity for aboriginal students (MOE 2013b). Policies were implemented to improve the advancement of these minority groups, such as setting special quotas to admit aboriginal students of special talent to higher education and financial aid/scholarships for overseas study. Despite this, aboriginal students tended to attend less privileged private higher education institutions (HEIs) with practical training programs, where female aboriginal students outnumber their male peers in 5-year nursing and other programs (Chou, 2015).

In addition, reports on gifted education and gender equity education were released to advance Taiwan's education equity and excellence agenda in the twenty-first century. For example, the Indigenous Affairs Commission was established in 1996 to strengthen educational excellence and quality for minority students. The crucial 'Education Act for Indigenous Peoples' was passed as a milestone in 2004 to safeguard indigenous people's education budget and welfare.

To promote gender equity awareness in all areas of society, the government required the establishment of gender equity-related subunits in every governmental agency and institution. Crucially, the establishment of the 'Commission on Women's Rights Promotion' in the cabinet and the 'Gender Equality Education Committee' within MOE promoted a gender-neutral. curriculum and instruction at all levels of schooling to ensure a non-discriminative campus and learning environment (Lee, 2012).

In 1963, the call for an overall review and upgrade of educational facilities and personnel for students with disabilities was put into practice at the legal and operational level, starting with the establishment of experimental schools and continuing with ongoing refinements to the Special Education Act. Based on four core values, prospective MOE policies have been incorporated into the education system and blueprinted as a major action plan for Taiwan for the next decade (MOE, 2011). The four core values include sensitivity, innovation, justice and sustainability. It stresses 'Respect and Care for Diverse and Vulnerable Groups' as Taiwan is now composed of more diverse groups and cultures than before, including the aboriginal culture, local Taiwanese culture, traditional Chinese culture and the cultures of new immigrants. As such, the education system must integrate people of different cultures and backgrounds into a new Taiwanese identity. Above all, the implementation of a 12-year basic education in 2014—a new milestone—is the most important education policy since the 9 year compulsory education was announced in 1968. Education for the "cultivation of the whole person, the value of life, respect for diversity, and a focus on international and lifelong learning" is considered to be the core policy promoted over the last few years (Chou & Ching, 2012).

Equity in Elementary and Secondary Schools

Taiwan's 9-year compulsory education reform was launched in 1968. It extended compulsory, state-funded schooling from 6 to 9 years and abolished entrance exams for junior high schools. This reform policy lifted a number of social and economic barriers to secondary education and significantly impacted women's access to higher levels of education, as well as for those students with low socio-economic status (SES) (Cherry, 2016; Kosack, 2012).

Despite this, when reviewing the 9-year compulsory education reform four decades later, it is obvious that the goal of education equity and excellence has yet to be fulfilled. For example, the learning gap between rural and urban students, the uneven distribution of educational resources and the excessive pressure to pass

entrance exams for secondary schools, all still exist nationwide (Cheng, 2011; Wang et al., 2011). As Taiwan faces a declining birth rate and an ageing population, many schools have been experiencing institutional closure and mergers. Two colleges closed in Pingtung County in 2015, and primary and secondary schools expect to feel the effects in the near future. The overall number of primary school students has dropped markedly since 2004, from 1.9 to 1.3 m in 2014, and the overall number of students in the education system dropped by 600,000 in that period. Nearly half of senior high and vocational schools are private and charge four times as much tuition fees as their public counterparts. Due to their typically lower entrance exam scores, the majority of students enrolled in private schools are from disadvantaged backgrounds (Chang & Yi, 2004). To overcome these educational inequality issues, MOE introduced a reform plan in the early 2000s and began to subsidise tuition fees for disadvantaged students enrolled in private senior high and vocational schools. It also introduced programs to improve the quality of senior high and vocational schools from 2007 onwards. The current Twelve-Year Basic Education Program (TBEP) was finally implemented in 2014 following a revision of the High School Law and other curriculum reform plans including teacher training. Some of the TBEP objectives are to promote equal educational opportunities, realise social justice and reduce learning gap and educational resource discrepancies (MOE, 2016).

Equity in Higher Education Expansion

Higher education in Taiwan has expanded dramatically over the past two decades, and admission to university has widened beyond the traditional social elites in the hope that mass higher education will open up new opportunities to traditionally disadvantaged groups. In the period from 1986 to 2010, 120 new HEIs were established or formed by the restructuring of colleges which brought the total to 163. The number of public universities and colleges grew from 15 to 51 in the same period (MOE, 2010a). This transition from higher education as an elite preserve to a mass education system replicates the global trend of university expansion (Tang, 2003; Trow, 2006; Yang, 2001).

Several studies have shown that the massification of higher education has produced mixed results in equity of opportunity and education quality (Shin, 2013; Shin & Teichler, 2014; Yang, 2001). Students from all socio-economic backgrounds have greater opportunities to pursue higher education as far as their personal ability and academic performance could take them, but there are still unresolved questions regarding equal access to education resources and funding (Chen & Chen, 2009). In most countries, the expansion of higher education has been driven by an increase in nonelite HEIs, especially in the private sector (Kim & Lee, 2006). This has led to a growing stratification in higher education, and a trend towards 'class reproduction' has emerged. As Astin and Oseguera (2004) indicate, SES, gender and ethnicity still play a critical role in deciding education opportunities despite the expansion of higher education. The difference in resource levels (public funding, alumni bequests,

facilities, calibre of faculty, etc.) between benchmark/elite universities and other HEIs continues to grow despite the dramatically widened access that the general public enjoy (Astin & Oseguera, 2004; Cheng & Jacob, 2012; Clancy & Goastellec, 2007). In this respect, Taiwan is no exception to this world trend (Wu, 2008).

The author has previously looked at issues arising from Taiwan's massification of higher education and found that inequality of opportunity in accessing public resources has been reinforced with respect to social class, gender and ethnic minorities (Chou, 2015). Whereas before, resources were allocated equally across the board, now they are allocated according to market mechanisms of competition, with the criteria being laid down in formalised assessments. Over the last two decades, the overall budget allocated to public HEIs has declined, and this deficit accounts for one third of the current funding shortfall (Song, 2006). Funding criteria in recent years have been geared around equitable redistribution between public and private HEIs. To enhance social mobility and remove the burden on the disadvantaged groups who overwhelmingly attend private HEIs, a 'performance-based' evaluation system was introduced to encourage more competition and accountability particularly in fund-raising and tuition fee policies (MOE, 2012). This drop in public funding has led to a corresponding increase in private investment, which in turn has led to the growth of a new form of inequality: those who can most easily bear the costs receive greater education opportunities, while those who are at a socio-economic disadvantage receive ever fewer opportunities for social mobility (Chou, 2007). Currently, students at private institutions represent around 70% of the total number in Taiwan. Most are from underprivileged family backgrounds and receive less government funding per capita. In consequence, growing budget discrepancies have developed between public/private and top/regular HEIs over the last decade (Chou, 2015; Wang et al., 2011).

In their exposition of 'Maximum Maintained Inequality' (MMI), Raftery and Hout (1993) argue that unless educational capacity is expanded to the point where it meets the demand of the elite groups, inequalities will continue to exist. When a system cannot accommodate all students, socially elite groups will benefit disproportionately from education expansion. Ayalon and Shavit (2004) in contrast argue that an 'Effectively Maintained Inequality (EMI)' will continue to exist due to SES, regardless of fluctuations in the enrolment rate. Certainly, the socio-economic background of students continues to play a critical role in deciding access opportunities to top/ benchmark universities despite the education expansion. A national survey conducted by Cheng and Jacob (2012) indicates an increased stratification by background of higher education opportunities even after the reforms of the 1990s. Students with the best chances of gaining entry to a top/benchmark university are typically those whose fathers have a graduate or college degree; mothers have a graduate, college or junior college degree; gender is male; family incomes are above NT$1.15 million; descended from post-war immigrants from the Mainland; and residency is in the northern or middle regions of Taiwan (Cheng & Jacob, 2012). Similar research on the student body of Taiwan's premier institution, the National Taiwan University, indicates that freshmen mainly come from backgrounds with rich cultural capital, higher SES and wealthy school zones (Luoh, 2002). Students from disadvantaged backgrounds, on

the other hand, tend to be concentrated in the less highly regarded private institutions (Fu, 2000; Hung & Cheng, 2008). Cheng and Jacob's work confirms that Taiwan conforms to the MMI and EMI frameworks mentioned above. Although greater numbers of students have access to higher education, inequality in Taiwanese higher education has not decreased as the student numbers tend to concentrate in the less selective vocational track HEIs and not the leading academic institutions.

Taiwan's 1968 Education Reform resulted in far greater numbers of men participating in higher education than ever before. Chen (2009) states that as HEIs expanded, so did women's opportunities for enrolment but only in traditionally female-dominated fields like education and nursing, rather than science and technology, a trend which has not significantly changed over time (Chen, 2012; MOE, 2013a). A further study (Huang & Luh, 2008) indicates that while women comprise more than half of all undergraduate students, males dominate at graduate level with far more men than women studying for doctoral degrees (MOE, 2014). Evidence summarised by Huang (2015) suggests that despite women performing better academically than their male counterparts, female university graduates experience more difficulties in finding a job and are not treated equally to men with comparable qualifications in Taiwan's job market.

One particular challenge facing Taiwan's expanded higher education system is the status of ethnic minorities, such as students from aboriginal tribes and children of local men and foreign spouses. Despite comprising 2.26% of the total population in Taiwan (MOE, 2013b), only 18.49% of aboriginal students receive education at college level or above compared with 38.7% for the general population. Nearly 86% of aborigines over the age of 15 receive no education above high school or vocational high school level as of 2012 (MOE, 2013c). While 85% of the general population attend HEIs in one form or another, only half of the aboriginal population does (MOE, 2013c). University enrolment rates for these students increased from 28.7% to 76.3% between 1994 and 2008, a fourfold increase. Despite this absolute gain, aboriginal enrolment rates still lag some 13% behind those of the general population. Access rates have increased by 40% but are still 40% behind their mainstream contemporaries. At the graduate level, there were a total of 18 aboriginal students in 1998, just 0.02% of all students, which rose to only 0.49% at the masters level and 0.2% at the doctoral (MOE, 2013a). Although additional funding is available to indigenous schools under Article 4 of the Rules and Regulations Implementing the Education Act for Indigenous Peoples (as amended 4 Aug 2014), the education available to these children suffers from the ongoing difficulties experienced in attracting and retaining qualified teaching staff in remote locations.

Distance and accessibility issues affect students and teachers alike, with the difficulty in striking a balance between schools in sufficient accessible locations and ensuring schools have a sufficient 'critical mass' of students creating many obstacles to both. Owing to long-standing marginalisation in wider society, aboriginal families have been routinely faced with the dilemma of either staying in their ancestral lands and thus having few opportunities for well-paying jobs, moving to urban areas and becoming assimilated into mainstream culture or attempting to strike a balance with the parents moving away to seek work while the offspring are raised by grandparents.

None of these approaches are wholly satisfactory in terms of the children's education: remaining in the hometowns perpetuates the cycle of marginalisation; assimilation leaves the families at a disadvantage compared to mainstream test-takers; and splitting the family means that the child's upbringing is in the hands of grandparents who rarely received education themselves beyond the minimum mandatory level for their era, which was rarely above Junior High School.

Another disadvantaged group is the local-born children of international marriages between local men and foreign wives. In 2009, approximately 430,000 women emigrated from China and Southeast Asia to Taiwan due to marriage (Chou & Ching, 2012). They often encounter difficulties in assimilating into Taiwanese society, especially in understanding the culture, learning local languages and finding employment. Their children (commonly known as the 'New Taiwanese') often experience conflicting identities and have many unique problems in education (Chang & Lin, 2012). Most attend elementary or secondary schools and made up 11.8% and 4.09%, respectively, of the total student population as of 2012 (MOE, 2013b). Although some achieve admission to higher education, many HEIs pose barriers to these students due to a lack of multicultural policies and provision.

Despite efforts to protect the education rights of these disadvantaged groups, children of indigenous peoples and foreign spouses continue to experience social discrimination as well as challenges arising from their more complicated family structures and low SES (Chang & Lin, 2012). The lower enrolment rates of aboriginal children compared to the general population suggest that they may have trouble adapting to mainstream education, due to their social status or economic situation (MOE, 2010b). Discrepancies in educational opportunity and quality therefore persist despite the expansion of higher education.

Discussion

Worldwide, education reform policy has continued to be challenged by the dilemma between equity and excellence (Gillian, Guzman, & Lippman, 2008). The Twelve-Year Basic Education Program in Taiwan provoked similar debates as a result of its proposal to abolish 'superstar' schools across the country (Wang, 2012). These schools, known as magnets for talented students, were to be opened to all students resident in their local neighbourhoods regardless of achievement or interests. Although this proposal aimed to give equal access to all, the public thirst for elite-status education has meant that the proposal has stalled and remains an unachieved ideal rather than an accomplished goal (Yang, 2005). Arguments against the proposal centred on the right of gifted or academically outstanding students to receive an education worthy of their potential and that this is necessary for the development of an equitable society free from the detrimental effects of the 'lowest common denominator'. The balance that should be struck between equity and excellence and how to achieve it are points worthy of further research and discussion during the formation of Taiwan's future education policies (Wang, 2012).

Similar controversies arise in Taiwan's higher education system. In an effort to lessen the discrepancies between applicants' interests and their college programs and reduce inequality, the 'multiple admission channel' system was introduced in 2001. The intention of this system was to ensure that students could fulfil their potential by being allowed to choose programs according to their own motivations while simultaneously assuring the quality of the education they received. It has, however, been criticised for intensifying the stratification of Taiwanese society and perpetuating social classes (Fu, 2000; Jao & McKeever, 2006). Despite the intended objectivity of university entrance by test scores, the system has handed considerable advantages to the children of graduates who can better advise on application packages and interview techniques (Chen & Qian, 2004; Chou & Ching, 2012).

The controversy over an effective and publicly accepted balance between equity and excellence shows no sign of abating and will no doubt colour Taiwan's future reform efforts as it attempts to create a fair yet internationally competitive education system which is also recognised as globally excellent.

Concluding Remarks

Taiwan has responded to the pressures of globalisation and the search for world-class education with political and social restructuring over the last 20 years, yet efforts to expand access to education while preserving social equity and educational excellence have created new dilemmas. In particular, the expansion of middle and higher education both opened new opportunities for students from disadvantaged backgrounds but also created new inequities regarding education quality and the job market. The new twelve year TBEP is intended to solve many of the equity issues around access to education while at the same time relieving the stress of intense entrance exam preparation and allowing students to pursue their own interests. At university level, the massive expansion of education from an elite pursuit to a generally available one was a response to global and local demand for talent. However, it ran into issues surrounding how to maintain quality while enshrining equal education opportunities. The resulting increase in the gap between public funding and university costs, along with the dangers of social stratification, gender inequality and ethnic discrimination, continues to vex policymakers and HEIs in the post-massification era.

Taiwan's higher education enrolment rate is one of the highest in Asia, yet the distribution of public educational resources continues to be concentrated on institutions favouring students from a limited range of social backgrounds. It has become evident that higher education acts to reproduce social class amongst the elite groups and grants them better education quality and job prospects at much lower cost, while disadvantaged groups continue to experience poor relative gains despite high absolute cost. As a result of the widening gap between haves and have-nots, equal opportunity and social mobility in Taiwan will suffer, with long-term negative consequences for the Taiwanese society.

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Chapter 5
Hong Kong's Journey Toward Equity in the Era of Appropriate Education for All

Kim Fong Poon-Mcbrayer

The Discourse Frame

It is important for us to be on the same page from the outset of our discourse. Thus, I will make clear who and what are included in this chapter. The primary subsets of the population included in this discourse of education for all in Hong Kong are school-age children (up to the completion of secondary education) with disabilities and persons from culturally and linguistically diverse backgrounds.

Hong Kong's journey is closely tied to its historical and political past as a British colony. As such, this chapter begins with an examination and analysis of Hong Kong's policy development in education as a British colony and examines legislation and policies toward education equity for the above subgroups of the population before July 1997. This is followed by a critical review and analysis of the change after the handover of sovereignty to the Chinese government when the implementation of the inclusive education policy officially began. The persistent challenges caused by the elite-oriented education system and social demands in Hong Kong's struggle toward education for all permeate the discourse.

Lastly, this chapter stresses the importance of understanding issues regarding difficulties in distinguishing and assessing certain disabilities (e.g. language-related disabilities) from difficulties due to cultural and linguistic diversity. This would aid the move toward education equity in Hong Kong, a vital and multicultural gateway to China, Asia, and beyond (Hong Kong Government, 2014a).

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Journey of the Colonial Hong Kong

As a small region in south China, Hong Kong was a small fishing community prior to the arrival of the British in the early nineteenth century. In the 1950s and 1960s, an influx of capital and manpower from China developed light manufacturing industries, while its tax policy attracted foreign investment to contribute to its rapid economic growth (Hong Kong Government, 1981; Poon-McBrayer, 2004). While a flow of refugees from China supplied the labour market Hong Kong needed during the economic boom, the high rate of illegal immigration exerted pressure on virtually every facet of the territory's social and economic development (Hong Kong Government, 1981). The education system came under tremendous pressure from the young population with 37% below age 20 and 25.3% under age 15 during the 1950s and 1960s (Hong Kong Government, 1981).

Accessibility: From Education as a Privilege to Universal Right

Because of the limited places set by the colonial government, Hong Kong's education system was highly selective and competitive. Education was primarily for the elite and the rich who could pay. Those admitted to government or government-aided[1] schools paid less than those in private schools. Children with specific difficulties due to disabilities and/or language differences might simply stay home to be cared for by parents or guardians. The rapid growth of population from the 1950s to 1970s put immense pressure on the colonial government to review educational provisions. In the 1950s, the development of primary education and teacher training became the top priority. Extensive government building programs were launched, with a peak of about 45,000 primary school places being added each year.

The policy rhetoric of education for all can be traced back to the 1960s when it was stated in the 1965 White Paper on Education Policy (Hong Kong Government, 1965) that the ultimate goal of any education policy was to provide every child with the best education which he/she was capable of absorbing, at an affordable cost to the parents and the community. In this document, the government also announced the reorganisation of the structure of primary and secondary education, set universal primary education as the immediate goal, and established the principle that the government would bear the financial responsibility of the future expansion of school education where possible. The enhancement of educational provision in the 1960s and early 1970s included: (a) improved teacher education with the restructuring of initial training courses and their extension from 1 to 2 years and with the introduction of 3rd year courses in selected subjects; (b) expanded advisory and inspection services for quality assurance; (c) development programs introduced for special

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[1] Government-aided schools are fully funded by the government but were initially established by non-profit religious or charitable organisations.

education; (d) the formation of Curriculum Development Committee; (e) reorganisation of the Hong Kong Certificate of Education Examination to allow greater flexibility in the choice of language used by candidates; and (f) the introduction of a regionalised administrative system to secure closer liaison with schools.

In 1971, the colonial government began to provide 6 years of free and compulsory primary education (Hong Kong Government, 1974). This landmark policy moved education from being a privilege to a universal right and served to diminish the effect of disabilities and socio-economic status on access to basic education; children aged 6–12 were guaranteed access to education for the first time in Hong Kong's history. As the Education Commission (1990) later commented, compulsory education means that the education system must cater for students with a wide range of abilities, interests, and needs.

The compulsory education, however, did not cover non-Chinese-speaking school-age children. The colonial government subsidised school places offered by the English Schools Foundation (ESF), primarily targeted at children of British citizens in Hong Kong. These school places received equal subsidies as local ones (Hong Kong Government, 1965). Such subsidies as those to ESF schools were additional to education allowances given to parents employed by the government or public institutions. Other non-Chinese-speaking children, such as Asian Indians, were not included in the policy deliberation. Information regarding their education is scarce and is not readily available in government databases.

Meanwhile, a policy document in 1974 affirmed the goal of a place for all children of the appropriate age who qualified for and wanted a secondary school education (Hong Kong Government, 1974) and served as the blueprint for the 9 years of free and compulsory education to cover the 6–14 age groups for 6 years of primary and 3 years of secondary education in 1978 (Hong Kong Government, 1981). The Secondary School Entrance Examination, the selection mechanism for elites to access education, was used to allocate school places based on performance (Hong Kong Government, 1981), instead of being filtered out of the education system. The elite system remained through performance tracking while access to education was guaranteed.

After 9 years of basic education, the elite system continued. Only 40% of 15–16-year-olds progressed to senior secondary levels, and at the ratio of 6:4 in 'grammar' and 'technical' streams,[2] depending on student performance in the Junior Secondary Education Assessment Scheme. The government later increased subsidised senior secondary school places from 60% of the 15-year-old population in 1981 to over 70% by 1986 (Hong Kong Government, 1981). Students with appropriate results in the Hong Kong Certificate of Education Examination could enter a 1-year program to prepare for entry to the Chinese University of Hong Kong or a 2-year program to prepare for the Hong Kong Advanced Level Examination (Llewellyn, Hancock, Kirst, & Roeloffs, 1982). Despite the open access to compulsory education, Hong

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[2] 'Grammar' schools adopt the central curriculum, and students with satisfactory academic performance were streamed into grammar schools, while students with less than satisfactory academic performance were streamed into technical schools where the curriculum had a stronger training component of technical skills for semi-skilled occupations such as auto-mechanics.

Kong schools still operated under a strong tracking and elitist system. Public examinations determined school placement and served as gatekeepers to further education. Competition for a higher ranking in the school league tables persisted (Poon-McBrayer, 2004). In other words, schools and students were stratified based on examination results.

Access to Education by Persons with Disabilities

With the elite system mindset, the colonial government did not take an active role in the provision of disability education until the establishment of the Special Education Section within the Education Department in 1960 (Education Commission, 1990). The 1977 White Paper Integrating the Disabled into the Community: A United Effort (Hong Kong Government, 1977) included a coordinated plan to develop special education, training, and related services. This document was the first official policy statement on the goal of moving toward early identification, and inclusive education, for students with disabilities. At the community level, the western trend of social distribution and equity was leading to claims by interest groups for a voice in determining what and how much should be distributed to whom in late 1970s and early 1980s (Llewellyn et al., 1982). However, special education services expanded primarily through an increased number of special schools between the 1960s and 1980s (Poon-McBrayer, 2004).

In 1990, the Education Commission (1990) issued a report that reiterated the need to develop a school-based system of support and provide special education opportunities in both mainstream schools and separate institutions. This report also recommended, and introduced the concept of, a whole-school approach to assisting students with developmental needs. This emphasised that teachers require the leadership of school heads and the full support of the management to create a positive environment so that student problems are responded to in a positive and constructive manner. To follow up on the recommendations, the Board of Education (BoE) decided to set up a sub-committee to review special education provisions in the summer of 1994 (Board of Education, 1996). Two years later, the Sub-committee on Special Education (Board of Education, 1996) issued a report that emphasised the need to demonstrate respect for human rights and achieve social equity in the context of education. This report advocated that the public schools be considered as 'a vehicle for the advancement of a just society' and special education as its headlights (Board of Education, 1996, p. 2). Inclusive education was powerfully reiterated as the goal of special education, and its implementation was urged. More importantly, it was focused upon bringing about both social and educational equity via education for those with disabilities in Hong Kong. The delineation of policies and legislation affirmed that the groundwork for moving toward educational equity was laid under the colonial government two decades prior to the official implementation of inclusive education when Hong Kong became a special administrative region of China in July 1997.

Disability Discrimination Ordinance of 1995

The enactment of the 1995 Disability Discrimination Ordinance (DDO) (Department of Justice, 2013) was the last and the only legislative effort of the colonial government on educational equity for persons with disabilities in Hong Kong. The DDO aims at eliminating and preventing discrimination against persons with disabilities in all aspects of life. It makes particular references in Sect. 24 to education with an emphasis on equal opportunities in access to, and meaningful participation in, local education (Department of Justice, 2013).

Major provisions associated with education include the unlawfulness for an educational establishment to discriminate against a person with a disability in the admission process, harass the person during the study period, and limit access to support services and premises. In other words, schools cannot refuse application for admission and enrolment or expel a student because of his/her disabilities, and should devise teaching approaches that can reduce or remove barriers to the student's learning, and modify the physical environments that may limit student's access to school premises (Department of Justice, 2013). Different from countries, such as the USA and Taiwan, where special education laws specify detail on implementation and enactment that do not only provide guidelines but also mechanisms for accountability, the DDO primarily offers a framework against discrimination. Coupled with the government's long-standing practice of emphasising policies rather than legislation, the DDO has seldom been used by stakeholders to demand their rights be respected.

Seeing its shortfall, the Equal Opportunities Commission was given the power to issue the Code of Practice on Education (Code) in conjunction with the DDO to lay out more detail for practice (Equal Opportunities Commission, 2013). The Code applies to all educational establishments in Hong Kong. Management bodies (such as governing bodies, management committees, or councils) at the kindergarten, primary, secondary, and post-secondary levels are obliged to comply with the DDO. The Code also applies to employees of educational establishments and the government in performing its functions and exercising its powers associated with education. However, both educational establishments and the public are not familiar with such details. A great deal of publicity is needed to make the Code functional in realising equity.

Postcolonial Journey Toward Educational Equity

At system and policy levels, postcolonial Hong Kong has made steady progress toward educational equity; free public education was extended to 12 years in the 2008/2009 school year (Hong Kong Government, 2014a), and the government is currently under immense pressure to provide 15 years of free education including 3 years of early childhood education. Shortly after the handover of sovereignty in

1997, the Hong Kong government launched a massive education reform to move toward greater effectiveness in equity and produce quality manpower to face the challenges of the knowledge economy (Education Commission, 2000). In addition to achieving equity, education was commissioned to 'enhance the knowledge, ability, quality, cultivation and international outlook of the people of Hong Kong' (Ibid, p. 3). The Education Commission (2000) defended the reform proposals as capable of producing elites while offering appropriate education to those with diverse learning needs with its five principles: student-focused, no-losers, quality, life-wide learning, and society-wide mobilisation. The scope of the reform covered all academic structures (the number of years for primary, secondary, and university education), examination and assessment systems, the school place allocation system, the curriculum, the university admissions system, the provision of lifelong learning at senior secondary level and beyond, and teacher training and qualification. The three hurdles created by public examinations during the colonial era were replaced by a single Diploma of Secondary Education at the end of 6 years of secondary education. Other public examinations were replaced by school placement allocation systems when children reach the admission ages for primary and secondary schools.

Despite the intentions to narrow the inequity gap, the publicly funded elite schools frantically tried to maintain their competitive edge by keeping their students' performance at the expected level. This tension eventually led to the drastic increase of the number of elite schools joining the Direct Subsidy Scheme (DSS) in the 2000s (Yung, 2006). The DSS was introduced to maintain a strong, independent private education sector, allowing schools the maximum freedom with regard to curricular, fees, and entrance requirements during the colonial era of 1991 (Chan & Tan, 2008). At present, these schools receive full subsidy from the government while they are allowed to charge school fees within a percentage of the subsidised fees. Autonomy in selecting elite students is promised to these schools under the DSS. With additional resources from parents and other organisations, they can employ the best qualified teachers with attractive remuneration and fringe benefits with more independent financial management (Yung, 2006). The key reason for elite schools to join the DSS is the ability to choose elite students to maintain their status in school league tables. As such, high-performing students cluster in these schools. Indeed, some of these schools have 1000 applications competing for around 100 places (Yung, 2006). The DSS has become another form of stratification and an instrument of elitism. Students with disabilities and academic difficulties are much less likely to enrol in these schools. In addition, this choice-based system inevitably favours high-income families because the much higher tuition fees charged by some DSS schools make them an option exclusive to high-income families (Chan & Tan, 2008). In the midst of attempting to reduce inequity through the current education reform and other support measures discussed below, the Hong Kong government permits, subsidises, and encourages schools to join the DSS. This is a de facto tool to widen the inequity gap.

Disability Education Under Inclusion Policy

Despite the dichotomy between elitism and equity, the change of Hong Kong's political status from a British colony to a Chinese special administrative region has witnessed strides toward education for all for students with disabilities and those from culturally linguistically diverse (CLD) backgrounds. I will first focus on disability education, followed by the education of CLD students.

Inclusive education, with a focus on students with disabilities, is perceived as the official beginning of Hong Kong's journey toward education for all. The inclusive education policy has increased its vigour, and forms of practice have been fast-moving and fast-changing. The concept of inclusivity was also gradually applied to non-Chinese-speaking children and immigrant children from mainland China.

Poon-McBrayer (2014a) describes three stages for the development of inclusive education in Hong Kong, namely, integration, integration in transition to inclusion, and inclusion. The first 3 years from 1997 to 2000 is classified as a period of integration, followed by the transition period from 2000 to 2003 and inclusion from the end of 2003 onwards. The core difference between integration and inclusion is that during the integration phase, students with disabilities had to earn their places in general schools but under the current policy have the right to be accommodated as much as needed in general schools.

In September 1997, a 2-year pilot scheme of integration was launched in seven primary and two secondary schools in Hong Kong (Poon-McBrayer, 1999a). This was the core period for the stage of integration; both school personnel and parents expected students to be responsible for keeping up with the standard curriculum, doing the same homework, being assessed by the same tests/examinations as others, and meeting the same academic requirements. Essentially, students had to 'earn' their place in the general schools, or they returned to special schools. Inclusive education was mainly an experimental platform to increase participation in general schools.

With this mindset, participation was restricted to those more likely to cope with the demands, with some support. As such, only students with specific disabilities were allowed to participate: mild intellectual disabilities, mild to moderate hearing/visual impairments, physical disabilities, and mild autism without intellectual disabilities (Poon-McBrayer, 1999a, 2000). Schools were given monetary and personnel incentives based on the number of students, and a lump sum for acquiring materials to support participating students. Each school was given an extra teacher if they took five students with disabilities and a teaching assistant if there was a total of eight students (Poon-McBrayer, 1999a, 2000). Meanwhile, schools were asked to assign an experienced teacher to serve as the resource teacher to support classroom teachers in instruction and behavioural management in collaboration with educational psychologists. A team of researchers from a local university were commissioned to support the schools in the form of participatory action research projects (Mittler & Poon-McBrayer, 1998; Poon-McBrayer, 1999a, 2000). A couple of short and ad hoc workshops were conducted to prepare teachers for the challenges.

The well-intended set-up for inclusive education was no match for the elite-oriented education system which had long cultivated non-accepting school cultures among school personnel (Poon-McBrayer, 2004, 2012). School leaders of pilot schools wanted to keep experienced teachers for elite students to maintain ranking in the league tables. Such teachers were also unwilling to serve as resource teachers to support integrated students. The elitist mindset resulted in the assignment of new and inexperienced teachers to this role in the pilot schools. No policies were available to guide referrals or instructional and curricular adaptation. The absence of policies or guiding principles led to many parents' erroneous view that their children could be 'cured' if given opportunities to learn alongside their non-disabled peers (Poon-McBrayer, 1999a). They requested transfer from special schools and then were surprised that their children did not make progress as expected.

The early implementation of inclusive education frequently came under fire from stakeholders. Repeatedly reported were issues such as inadequate preparation for school personnel to deal with the challenges, heavy workload, excessive types of disabilities in a single classroom, and insufficient resources (e.g. Poon-McBrayer, 1999a, 2004; The Hong Kong Primary Education Research Association & Special Education Society of Hong Kong, 2006; Wong, Pearson, Ip, & Lo, 1999; Wong, 2002). To align with the international trend of inclusion, the government pressed on to keep integration as the official policy.

The immense pressure to improve the practice of inclusive education brought significant policy change, and practices shifted into the transition stage toward inclusion in 2000. The scope of implementation was rapidly expanded with school participation increased to 140 by 2003. During this transition period, the government increased funding, pressured school principals to assign experienced and effective teachers to serve as resource teachers, mandated better timetabling for co-planning and greater reduction of teaching load, began to offer systematic training opportunities for teachers, publicised accommodations during public examinations to stakeholders, and emphasised the adoption of a whole-school approach to involve all teachers in educating students with disabilities (Poon-McBrayer, 2012). These measures were inconsistently practiced among schools but did signal a shift from integration to inclusion by providing a platform to permit different learning paces and push schools into the mindset of accommodation.

The continual pressure to further improve inclusive education provisions resulted in the government's new policies that moved Hong Kong from practicing integration to inclusion toward the end of 2003: entitlement of parental choice of schools, participation of all schools in inclusive education, and adoption of indicators of inclusion to measure school effectiveness. Giving parents the right to choose schools, irrespective of the severity of the disabilities of their children, was the beginning of Hong Kong's era of zero rejection and is the single most important policy that indicates inclusion practices (Poon-McBrayer, 2012). Encouraging all schools to participate in 2003 was another iconic gesture toward inclusion. The government's use of indicators of inclusion to provide schools with guidelines for and evaluation of effective inclusion practices (Education Bureau, 2008a) also represented a paradigm shift from integration to inclusion. The indicators suggest practices congruent with what are considered the conceptual framework of

inclusion. In 2003, the government also introduced a new funding scheme (now known as the Learning Support Grant), to require schools to adopt a whole-school approach, while permitting greater autonomy in managing and using the funds to increase school-based support (Education Bureau, 2008b). Other support measures and incentives have also been introduced, for example, the Enhanced Speech Therapy Grant of 2006, the School Partnership Scheme of 2007 to provide interschool support by those with proof of exemplary practices (Ibid), and the increase of Learning Support Grant by 30% with a cap of HK$1,500,000 for each school beginning September 2014 (Hong Kong Chief Executive Policy Address, 2014a). All these propelled Hong Kong into the era of inclusion and toward greater educational equity for those with disabilities.

Ethnic Minority Education after 1997

For the purposes of the census (Hong Kong Census and Statistics Department, 2012), 'ethnic minorities' refer to immigrant children from mainland China and non-Chinese-speaking (NCS) children, including immigrants from Asia, local children of South Asian ethnicities, and mixed races. In census statistics, Chinese from mainland China are only considered immigrants and minorities if they have resided in Hong Kong for less than 7 years and their proportion in the population was 2.5% in 2011 (Hong Kong Census and Statistics Department, 2012). In the 2013/2014 school year, 2656 mainland Chinese immigrants were first admitted to various Hong Kong primary schools (Education Bureau, 2014a) and 2644 to secondary schools (Education Bureau, 2014b). A total of 451,183 ethnic minority citizens, constituting 6.4% of the population of Hong Kong, lived in Hong Kong in 2011 (Hong Kong Census and Statistics Department, 2012). The most recent Hong Kong Chief Executive Policy Address (2014b) revealed that more than 60,000 South Asians alone currently live in Hong Kong, an increase of 50% over the past decade. The 2011 census (Hong Kong Census and Statistics Department, 2012) revealed that among ethnic minorities aged 5 and over, English was the most commonly spoken language at home constituting 44.2%, followed by Cantonese (31.7%), Filipino (3.7%), Indonesian (3.6%), Japanese (2.2%), Putonghua (1.0%), and Chinese dialects other than Cantonese and Putonghua (0.3%).

Hau's (2008) longitudinal study found that:

(a) Most of the NCS (92%) population were born in Hong Kong and live with their fathers (83%) and mothers (98%) at home, with parents who have been in Hong Kong for over 10 years (on average 13 years for fathers and 11 years for mothers).
(b) About 50–60% of NCS parents versus only 25–30% Chinese-speaking parents were fluent in spoken and written English.
(c) Only 5% of NCS students used Cantonese at home, and their parents tended to have limited proficiency in Hong Kong's major Chinese dialect, spoken Cantonese (totally non-Chinese speaking among one-third of the fathers and

half of the mothers), and Chinese writing (Chinese language illiteracy among 75% of fathers and 82% of mothers).

(d) NCS parents were slightly less educated and had a higher rate of unemployment (the former 4% but 15% among the NCS) with lower income than their Chinese-speaking counterparts.

Academically, NCS students were found to (a) have higher English proficiency, much weaker Chinese proficiency, and slightly weaker mathematics proficiency upon admission to primary 1; (b) most NCS students (88%) had a kindergarten education, mainly through English (73%) for an average of 2.59 years; and (c) NCS did not differ in terms of the availability of other helpers at home to advise on academic matters (Hau, 2008). Basically, NCS students seem to have both advantages and disadvantages over the local Hong Kong children.

NCS children may choose neighbourhood schools or schools that traditionally admit a larger number of ethnic minority students (Hau, 2008). Support policies and services officially began in postcolonial Hong Kong. In September 1997, the Education Bureau introduced a block grant, namely, the School-Based Support Scheme Grant, for schools with intake of children newly arrived from the mainland and extended it to include non-Chinese-speaking and returnee[3] children in April 2000, enabling schools to provide supplementary lessons on language and other subjects as appropriate, adapt curriculum, purchase teaching aids and resource materials, and organise programs for orientation and guidance purposes (Education Bureau, 2013). The grant was given at the rate of HK$3289 per child at primary level and HK$4874 at secondary level since September 2013 (Ibid). In addition, recurrent funding ranging from HK$300,000 to HK$600,000 is given to all schools admitting ten or more NCS students (Hong Kong Government, 2014b). In spite of support funds and measures for NCS, they had more difficulty integrating than Chinese immigrants (Hau, 2008). The Government has thus recently pledged to strengthen support by assisting NCS students to improve their Chinese proficiency from early childhood education to secondary levels (Hong Kong Chief Executive Policy Address, 2014b) with details to be revealed at a later date.

Collision of Cultural-Linguistic Diversity and Disabilities

Education and related issues for the two subgroups of the population have so far been discussed separately. The complexity created by collision of cultural-linguistic diversity and disabilities has yet to gain the attention of the Hong Kong policymakers. The discourse on the impact of the collision of these two conditions tends to be political and controversial, and issues are difficult to unravel. Politicians around the

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[3] Returnees refer to those who are originally from Hong Kong, have emigrated to other countries, and have returned with their children to reside in Hong Kong. Their children are frequently non-Chinese speaking or with limited proficiency in the Chinese language.

globe have long been under pressure to address educational equity for ethnic minorities who receive special education services.

Researchers and scholars have debated and continue to do so with regard to how to achieve accurate identification and assessment of determining which factor or a combination of factors being the culprit to affect educational equity as well as how to provide appropriate and equitable education to these children. Artiles and Bal (2008) concluded that, after over four decades of discussions, the core concerns over whether equity has been achieved in the education of CLD students with disabilities remain the same: disproportionate representation and inaccurate identification and assessment (e.g. Garcia & Ortiz, 2006; Harry, 2008; Schon, Shaftel, & Markham, 2008; Spinelli, 2008; Welner, 2006).

Disproportionate representation refers to both over- and under- representation in comparison of the proportion of minority students in special education and their proportion in the entire population. For example, the figures show that African and Hispanic American children are overrepresented in special education programs for language and behavioural-related disabilities but underrepresented in gifted education in the USA (e.g. Bean, 2013; Guiberson, 2009; Irvine, 2012; Zhang, Katsiyannis, Ju, & Roberts, 2014). Disproportionate representation has also been found to be most prevalent in specific learning disabilities, speech impairment, emotional and behavioural disorders, and mild intellectual disabilities (e.g. Talbott, Fleming, Karabatsos, & Dobria, 2011) where difficulties in language learning and behaviours different from the mainstream cultures may be misunderstood and misdiagnosed as difficulties resulting from these disabilities.

It is therefore not surprising that identification and assessment that lead to their placement in special education programs have been severely criticised (e.g. Coffey & Obringer, 2011; Coutinho, Oswald, & Best, 2002; Moores-Abdool, Unzueta, Vazquez Donet, & Bijlsma, 2008; Talbott et al. 2011) in the last few decades. Traditional assessment practices involve standardised assessment tools for intelligence and academic achievement. For example, the discrepancy between the intelligence and achievement scores has been used to determine whether individuals have specific learning disabilities in the USA and Hong Kong. In the case of the USA, a student with an intelligence quotient score one standard deviation higher than that of the achievement score would be considered to have a specific learning disability (Restori, Katz, & Lee, 2009). In Hong Kong, a child is considered to have a specific learning disability if his/her intelligence score stays within the normal range but his/her achievement score is two grades or more behind. The criticism appears when CLD students speak different home languages from the working languages in schools and are thus considered to have been inappropriately assessed when intelligence and achievement tests were normed based on the school languages and cultural knowledge of the majority population. Thus, instrument developers and researchers, such as those in the USA, have attempted to improve them by stratifying the normative sample to match current census data based on sex, race/ethnicity, parent education level, and geographical region for each ethnic group of the population in recent years (Wechsler, 2012).

Discussions and debates on alternate approaches to the use of standardised instruments for assessing student needs began to emerge, and proposals were made. In the case of the USA, Response to Intervention (RTI) was introduced in 2000 and recommended by the 2004 reauthorisation of the Individuals with Disabilities Education Act as an identification means in addition to or in lieu of the aptitude – achievement discrepancy formula (Ardoin, Witt, Connell, & Koenig, 2005). This approach is selected as an example because Hong Kong also adopted this model to improve inclusive education a few years later. The RTI model comprises multi-tiered instructional delivery systems in which teachers provide research-based instructional interventions to students and increase in intensity contingent upon students' response (Proctor, Graves, & Esch, 2012). Thus, an RTI approach requires schools to scrutinise quality of instruction and shift focus to identifying students at risk. Only students who fail to respond adequately will qualify for special education services, and such decisions are made by directly evaluating students' response to varying levels and types of intervention (Ardoin et al., 2005). In other words, students must demonstrate a need for special services and resources that cannot be supported in a typical classroom (Barnett, Daly, Jones, & Lentz, 2004). The RTI model has been found to provide an opportunity for teachers to intervene without waiting, minimise biases, and decrease disproportionality among ethnic minorities (Proctor et al., 2012). On the other hand, RTI requires considerable financial, human, and educational resources (Crepeau-Hobson & Sobel, 2010). For example, RTI requires general education teachers to differentiate instruction and accommodate diverse learners above and beyond what they already do, adding to their already heavy workload. Extra resources to support teachers are necessary to make RTI an effective approach and to bring equity to CLD students.

In 2004, the Hong Kong government introduced the 3-tier intervention (or support) model (Education Bureau, 2012), which resembles the RTI process in the USA, short of procedures and guidelines to ensure quality teaching as tier one intervention. The 3-tier model is also tied to the Learning Support Grant as mentioned earlier. Schools are left to decide how they can make use of the funds to provide education services in accordance with this model. In addition, the government has not even begun to collect figures on CLD students with disabilities. Thus, their representation in special education programs is unknown. Thus far, only a case study on the mismatch of native languages of a Chinese immigrant child diagnosed with attention deficit hyperactivity disorder can be located to address the pertinent issues (Poon-McBrayer, 2014b). No other studies can be located to examine issues relevant to minority students with disabilities in Hong Kong after a thorough search in all major education databases. This, in and of itself, reflects a lack of awareness of these issues among both policymakers and researchers. This unknown turf in Hong Kong has yet to be explored, researched, and policied.

Concluding Remarks

Educational equity lies in the premise of appropriateness; in other words, it meets a child's specific learning needs. The US Individuals with Disabilities Education Act serves as the prime example as it specifies appropriate education as the entitlement of children with disabilities. In its most extreme sense, every child should have an individualised educational programme, rather than a single curriculum and performance standard. However, ensuring support measures that offer appropriate education for these children is easier said than done. Despite having a law to protect a child's right to an appropriate education, the USA continues to struggle to achieve this goal. Deeply rooted in the ability-driven philosophy and thus meritocracy (Lim, 2013), elitism has played and will continue to play a significant role in any nation's journey toward education for all.

The tension between elitism and equity intensifies when countries face competition in economic development and international league tables on academic performance. International examples for such dilemmas are readily available. In recent years, the US government, in an effort to hold teachers accountable for student learning, raised the expected achievement bar of all students. This placed demands on poorly prepared teachers to effectively teach CLD students who were then often referred for special education programs for support (Vasquez III et al., 2011). In Singapore, effort has been made in the last decade to moderate the rigidity of the education system's tracking mechanisms by merging the different academic tracks at both the primary and secondary levels (Ministry of Education, 2004, 2007), phasing out the gifted program at the secondary school level, providing language facilitators to ease students' transition from their mother tongue languages to English in schools, and increasing the number of Allied Educators to support students with disabilities (Lim, 2013). As demonstrated above, Hong Kong has made strides toward educational equity in the policies and practices of disability education and education for CLD students. However, Hong Kong has yet to address the complexity caused by the interaction of cultural-linguistic diversity and assessment of high incidence disabilities. The major hurdles to overcome include elite schools' persistent pursuit for high performance in high-stake public examinations, the struggle to reduce curricular rigidity and minimise policy-practice discrepancies, the need to establish monitoring mechanisms and to provide post-school planning, and the effort to improve public and parent education and teacher preparation. Hong Kong's journey toward education equity will continue to be shaped by improved policy, international trends of research, as well as its obligation to comply with the United Nation's Convention on the Rights of Persons with Disabilities (United Nations Enable, 2012) and International Convention on the Elimination of All Forms of Racial Discrimination (United Nations, 1966). In a nutshell, the search for ways to eliminate biases and promote practices for equitable education with adequate resources and preparation must continue in the midst of international pressure of equality for all and nurturing elites.

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Chapter 6
Rethinking Equality and Equity in Multicultural Education in a Diversified Society: The Case of Language Education for Newcomer Students in Japan

Miki Sugimura

Introduction

The Japanese school education system has been evaluated from the viewpoints of high performance, quality and its contribution to producing good human resources/assets. The Japanese education model has been a base in the East Asian model of education. Sato (2011) states that China, South Korea, Hong Kong, Taiwan and Singapore promoted modernisation along the lines of the Japanese education model and observes that the East Asian model has common features. Japanese education has attached importance to high efficiency and productivity, with centrally controlled bureaucracy. Students are expected to be diligent in their study and have gained international prominence over the years due to their top performance on international tests like the Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA).

However, Sato (2011) also observes that the Japanese education model or East Asian model lost its grand design for future schooling in Japan in the late 1990s, while a neo-liberal educational discourse has expanded. Japan has the serious problems of a low birth rate, an ageing society, and a shrinking population. For this, it is necessary to increase the workforce to sustain its development, and Japan has been trying to accept foreign workers focusing on Nikkeijin (South Americans of Japanese descent) since the 1980s. Since then, Japanese society has included people of Korean and Chinese ethnicity with different nationalities. Since 2007, the Chinese population has been the largest of the foreign nationalities (Tsuneyoshi, 2011). As a result, some schools situated in areas with many foreign workers now face the issue of integrating more foreign students.

In particular, after the revision to the Immigration Control and Refugee Recognition Act *(shutsu nyukoku kanri oyobi nanmin nintei-hou)* in 1990, the number

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of Japanese Brazilians and Japanese Peruvians has rapidly increased. Their first generation were Japanese and emigrated to Brazil and Peru; the second and third generations – Brazilian and Peruvian – are Japanese Brazilians and Japanese Peruvians. They are 'Nikkeijin'. Although they seem to be 'immigrants', the Japanese government – opposed to new immigrants – instead calls them 'newcomers'.

Initially, most newcomers intended to work in Japan only temporarily. However, many later decided to remain and school their children locally. Some entered private Brazilian or Peruvian schools, but most children attended Japanese public schools where education at the primary and lower secondary levels is free. However, the medium of instruction in Japanese public schools is Japanese. Moreover, teachers are not familiar with teaching foreign students from non-Japanese-speaking families.

Considering these realities, how can education policies reflect the coexistence of newcomers and Japanese-born citizens? Before globalisation, Japan had only to consider Japanese people and society. Japan could realise *equality* by giving educational opportunities to every child.

However, Japanese schools now have the additional role of educating foreign students with different cultures, languages and ways of thinking. In this situation, it is not enough for us to give educational opportunities to students, but it is necessary to consider the differences among students to meet their educational needs.

The purpose of this paper is to rethink the significance of *equity* and *equality* of multicultural education through the prism of language education policy for newcomers' children. First, the social background of newcomers will be explained, followed by the transformation in education policy. Second, language education for newcomers, which is the key issue in their education, will be discussed from the perspectives of Japanese language education and native tongue education. Lastly, multicultural education for newcomers through language education will be reviewed, which will urge us to rethink the difference between *equality and equity* of education.

Background and Transformation of Education Policy for Newcomer Children in Japan

Increase of Newcomer Children and Diversification of Society

Japanese society was traditionally regarded as a homogeneous society consisting solely of Japanese people. Historically there have been ethnic minority groups, i.e. the Ainu ethnic group, Okinawa tribe, Chinese and Koreans. The history of Chinese and Korean settlers in Japan begins at the end of the nineteenth century; having lived in Japan for more than 100 years, they are known as 'oldcomers'. However, the number of 'newcomers' has been increasing since the 1980s, especially after 1990, when the Immigration Control and Refugee Recognition Act (*Shutsu nyukoku*

kanri oyobi nanmin nintei-hou) was revised. As Tsuneyoshi (2011) observes, the nationalities of foreigners in Japan has been diversifying.

In 1980, the number of Japanese Brazilians living in Japan was 8381. By 1990, that number had increased to 67,303, reaching 101,513 in 2000. The number of Japanese Brazilians living in Japan peaked at 312,979 in 2006 but had levelled to 181,317 by 2013. Japanese Peruvians numbered 1362 in 1980, and this increased to 11,478 in 1990 and 15,852 in 2000. In 2006, 52,217 Peruvians were living in Japan, but this had decreased to 48,598 by 2013 (Ministry of Justice, Japan, 2013). Decrease in populations occurred because of the economic recession in which many middle or small-sized companies with Nikkeijin workers reduced their workforce and moved their plants overseas, with many Nikkeijin returning to their home countries. Moreover, the Great East Japan Earthquake in March 2011 led to a decline in the number of foreigners in Tokyo. However, these numbers were influential in Japanese schools, which had previously accepted only Japanese students.

According to the Ministry of Education, Culture, Sports, Science and Technology (Japanese Ministry of Education known as MEXT), in 1999, there were 18,585 non-Japanese-speaking children who needed special Japanese language education or who could speak Japanese but could not understand it well. This number increased to 28,575 in 2008. After the Great East Japan Earthquake in March 2011, the number of foreigners decreased. However, the number of children who needed special Japanese language education remained at 27,013 in 2012, and it started to increase again to 34,335 in 2016 (Ministry of Education, Culture, Sports, Science and Technology, MEXT, 2013, 2017).

The distribution of these students in the year of 2012, classified by their native tongue, is as follows: Portuguese-speaking students numbered 7739 in 1999, 11,386 in 2008 and 8848 in 2012; and Spanish-speaking students numbered 2003 in 1999, 3634 in 2008 and 3480 in 2012. Besides Brazilians and Peruvians, Chinese newcomers have also been increasing. After 1980, more Chinese people have come to work in Japan. Since 2007, they have outnumbered Koreans, who previously topped the foreigner population in Japan. Chinese-speaking students numbered 5674 in 1999, 5831 in 2008 and 5515 in 2012 (Ministry of Education, Culture, Sports, Science and Technology, MEXT, 2013).

Figure 6.1 shows that Japanese society has been diversifying with an inflow of newcomers. These newcomers study at the primary and secondary levels and most are in Japanese public schools. However, the Ministry does not regard them as subjects of compulsory education in Japan. As such, their parents have no obligation to send the children to school. Some newcomer parents do not attach importance to education because they plan to return to their home country after working in Japan for several years.

However, most parents need to send their children to school. Few choose English-medium international schools as their tuition fees are expensive. Some parents choose Brazilian schools or Peruvian schools, where their children can study in Portuguese or Spanish and can learn from their home country's textbooks and curricula. This helps their return to homeland schools in the near future. Yet there are, few Brazilian and Peruvian schools, and most are private and, as such, are
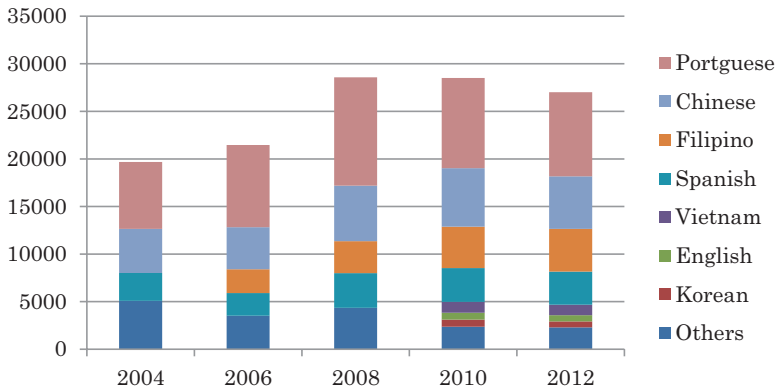
Fig. 6.1 Number of foreign students, by native tongue, who need Japanese language education. Source: Ministry of Education, Culture, Sports, Science and Technology, Japan, MEXT, (2013)

expensive. Thus, many parents enrol their children in the Japanese public schools. These schools use a Japanese curriculum and syllabus, and the medium of instruction is mainly Japanese.

Transformation of Educational Policy for Newcomer Children

Historical Background of the Japanese Government's Negative Involvement in Education for Foreigners

'Oldcomers' were formerly regarded as foreigners, totally different from Japanese people. In 1899, the Japanese government adopted a policy that foreigners were not subjects to be protected under the Nationality Law (Kokuseki-hou) (Matsuo, 2013, p. 232). This policy reflected the fact that the Japanese government did not care about the education for foreigners. However, Chinese and Korean people were so concerned about their children's education that they established their own ethnic schools. Because the schools taught specific political principles, the Japanese government did not recognise the schools as formal education regulated by law, and their certificates were never authorised. For this reason, graduates of these schools cannot take entrance examinations for national and public high schools and universities, and must take another examination prior to the entrance examinations. Considering these disadvantages, many oldcomers sent their children to Japanese public schools. Most of their children were born and grew up in Japan and can speak Japanese at the same level as native students; this is so common that many Chinese students cannot speak Chinese despite their Chinese descent.

The Japanese government's education policy for foreigners was the same for all schools for foreigners until 2003. Then, it agreed to recognise the certificates of

international schools with English as the medium of instruction. This policy upsets Chinese and Korean schools as they were still unrecognised and were not equally treated. Under the new policy, each university could decide whether or not to recognise such schools' certificates for entrance examinations. This situation has gradually changed in the process of accepting more newcomers.

Building a Society of Multicultural Coexistence Through Education

Considering the growth in newcomer students, the Ministry of Education, Culture, Sports, Science and Technology Japan (MEXT) developed an education policy. In the 1990s, MEXT stationed additional teachers at schools attended by newcomer students. However, the number of newcomer students unwilling to go to school, i.e. school dropouts (*Futoukou* or *Fushugaku*), increased, and this came to be recognised as a social issue in areas with high numbers of newcomer foreigners. Sakuma (2006) notes that approximately 40% of foreign children in Japan go to Japanese public schools and about 30% of them go to ethnic schools, i.e. Chinese or Korean schools, 20% return to their home country or change schools, and 10% have no chance to go to school.

There are many reasons students drop out of school. First, foreigners have little information on schooling in Japan. Second, newcomer parents do not send their children to study abroad for financial reasons. Third, the medium of instruction is difficult as most Japanese schools have Japanese as their main medium of instruction. Newcomers need to learn Japanese to understand the school curriculum and live, study or work in Japanese society. Considering this situation, some organisations have already started supporting such students by teaching Japanese and translating class contents.

In 2001, 13 local governments in areas with large populations of foreigners organised the Association of Cities with Concentrations of Newcomer Foreigners (*Gaikokujin Shujutoshi Kaigi* [translated by Tsuneyoshi, 2011]). These cities faced the local realities of multicultural and diverse change and started discussions on policies for foreign residents, including education. The association announced the first declaration to build a multicultural society of coexistence (*tabunka kyosei shakai*) and, afterwards, continued networking such cities and issued statements for the social welfare and education of newcomers.

Following this movement, the Ministry of Internal Affairs and Communications (MIC) submitted a proposal to accept newcomer children at public schools. The MIC also established a meeting to build a multicultural society in 2005 and insisted on the importance of multicultural coexistence. MEXT started to discuss the education of newcomer students at the primary and secondary level in 2007 and set up a section for their education in 2009. Finally, MEXT announced the Basic

Principles of Education for Newcomer Foreign Residential Students (*Tieu Gaikokujin no Kodomo no Kyoikutou ni Kansuru Kihon Houshin* [translated by the author]).

This principle especially focused on Japanese education for newcomer children and overseas students. First, taking into consideration newcomers' habit of settling in Japanese society, the government urged public schools to accept more newcomer students and prepare them for the system of Japanese education and to support students in planning for their future or provide guidance counselling to them. Secondly, the government will support newcomers' schools (like Brazilian schools and Peruvian schools) to become government-authorised educational foundations to keep their school management stable. Thirdly, Japanese education should also be encouraged for adult newcomers with no previous opportunity for schooling, as well as for overseas students to aid obtaining jobs in Japan. This policy attaches importance to Japanese education as a core subject for foreigners because it regards Japanese language ability as a prerequisite for their staying and working or studying in Japan. The Japanese policy for foreigners is based on Japanese education, while Japanese society becomes more diversified and multicultural (Sakuma, 2011).

Language Education for Newcomer Children

Japanese Language Education and Some Issues

In 2010, MEXT started to introduce guidelines for Japanese language education and to promote a method of teaching Japanese as a second language (JSL) as well as to make an evaluation scale and a guidebook on teacher training while considering the appropriate number of Japanese teachers for schools. Moreover, MEXT compiled the *Gaikokujin Jidou Seito no Ukeire no Tebiki* (*Guideline for Accepting Foreign Students;* [translated by the author]) (Ministry of Education, Culture, Sports, Science and Technology, MEXT, 2011). This guideline emphasised the importance of the Japanese language with regard to: (1) gaining access to schooling; (2) acquiring a language tool for studying the other subject; (3) developing Gakuryoku (academic ability) and (4) acquiring confidence to live in Japan. At the same time, it mentioned the importance of solving issues to preserve the native tongue and culture, look after children's future careers and children who do not go to school. The guideline also mentions the roles of school administrators, teachers, Japanese teachers and the Board of Education of the local government and was distributed to all public schools.

Currently, the Japanese government and MEXT promote Japanese education as a foundation of education for newcomer students. MEXT created a website for foreign students' studies which offer materials for their use. MEXT has already started designing achievement tests for Japanese learners and revising a teacher's manual.

However, there are some issues in the practice of Japanese education. The first issue relates to the children's inability to preserve their native tongue or who forget

it while learning Japanese. Foreign students can become fluent in Japanese through school education, and in some cases, they are unwilling to use their native tongue because their Japanese friends cannot understand them. These students find it difficult to communicate with their parents who understand only the native tongue. Even among children who can understand their parents' native tongue, some are unwilling to reply to their parents in the native tongue and try to use Japanese. This results in a very serious generation gap and psychological issues between the parents and children (Kojima, 2006).

Secondly, even if children can speak Japanese, they can sometimes encounter problems learning subjects taught in Japanese. Conversational levels and the thinking and analysing levels are different; if students do not know academic Japanese, necessary for understanding abstract concepts, it is difficult for them to catch up with the Japanese students. This issue becomes more serious when they wish to advance to higher education (Miyajima, 1999).

Thirdly, Japanese education is necessary not only for students but also for their parents. If the parents cannot understand any Japanese, there is a gap or difference between them and their children, and the school and teachers have difficulty communicating with the families. As such, Japanese education is important for the parents' generation. Some schools request volunteer teachers for this kind of Japanese language course, but there seem to be many difficulties in fulfilling these (Kojima, 2006).

Fourthly, we must consider regional differences. There are some areas where many foreigners live, i.e. Tokyo, Aichi, Osaka, Kanagawa, Shizuoka, Mie, Gifu and Gunma prefectures. However, there are also areas where few foreigners live, i.e. Tottori, Tokushima, Kochi, Miyazaki, Aomori and Akita, and the differences between these prefectures are large. In some areas, Japanese language education is a big issue; however, others do not have this problem. Moreover, in terms of ethnic groups, some regions have mainly Japanese Brazilians, while others have a variety of ethnic groups, which require the local government to consider its regional features (Sakuma, 2011).

Native Tongue Education

In the discussion on the role of Japanese language education, native tongue education was not the main target of the government. MEXT has entirely focused on Japanese language education, while native tongue education at public schools has been implemented as supplementary lessons given by volunteer teachers after school. Some public schools in districts populated with many newcomers have bilingual teachers and staff to support newcomer students and their families with a local government budget; however, this is not yet a mainstream practice.

In reality, native tongue education is held in high regard for those who live abroad. Traditionally, the native tongue has been taken as the core of culture and history and a very important means for people to maintain their cultural and ethnic

identity. The reason they have been insisting on native tongue education is that it should be a foundation of education for ethnic groups.

The other reason for the importance of the native tongue to newcomer people is that it is the only language which can bridge the first generation of parents with the second generation of children. The children can become Japanese speakers through schooling with Japanese teachers and friends; however, parents cannot speak Japanese well as they have few opportunities to learn it or form social relationships after coming to Japan. Children are often interpreters for their parents to live or work in Japan (Miyazaki, 2014).

Therefore, the native tongue should be important. Yet recently, there seems to have been a change in the function of native tongue education. The native tongue is still used by newcomers to practice their own culture and history, but at the same time, they attach importance to Japanese education and, in some cases, seem to put Japanese education first. Newcomers regard Japanese as an important means for living, studying and working for a better life, and learning it seems to be a kind of strategy. Shoji (2010) calls this function of language 'language as asset' (translated by the author). This means that if a person can acquire the ability of speaking, listening, writing and reading in the language, then he/she can live by himself/herself using the language that is needed for him/her to survive in daily life. They select the more useful, reliable and valuable language for their life, study and work, and their native tongue becomes the second priority.

If we take a look at the cases, including English, the situation is more strategic. Sugimura (2011) analyses a situation of changing Chinese schools in Japan. She explains that the parents and children were still concerned about speaking Chinese as their cultural foundation but, at the same time, preferred to learn English and Japanese. As mentioned above, the number of Chinese coming to Japan in recent years, the 'New Chinese', has been increasing. The more recent immigrants have a different way of thinking from the 'Old Chinese'. It is said that the New Chinese are more pragmatic, and they expect Chinese schools to be a strategic programme wherein students gain useful skills for future careers. For this reason, Chinese schools give importance to English and Japanese along with Chinese and try to provide a trilingual education with the idea of 'language as assets'. As a result, while the main medium of instruction is still Chinese, English lessons are taught in English, and Japanese lessons are taught in Japanese, much like a Chinese-medium international school.

This is a feature of Chinese schools now; even Japanese families who attach importance to a trilingual education have started sending their children to Chinese schools. This was originally illegal, because all Japanese parents were obligated to send their children to a normal public or private school recognised under Article 1 of the School Regulation Act *(Gakkou Kyouiku Hou).* Chinese schools are not recognised by the Act yet. However, some parents intentionally send their children to Chinese schools even though the school certificates cannot be used to take the entrance examination for higher education levels; they expect Chinese schools to offer three languages (Chinese, Japanese and English) to provide language as a personal asset.

Multicultural Education in a Diversified Society

Significance of Japanese Language Education and Native Tongue Education

Considering the case of language education in Japanese society, it can be observed that there are three movements of language education. First, the Japanese government has been paying attention to Japanese language education given its importance for foreigners to learn Japanese for their study, work and daily life in Japanese society. This movement is a kind of assimilation process. The Japanese government always hopes that foreigners are well prepared to become members of Japanese taking Japanese as a common language in Japan. However, they have not strongly dealt with native tongue education for foreigners.

Secondly, the native tongue education movement is based on another traditional view of the significance of native tongue education. Some people have insisted on the importance of native tongue education to protect their culture, historical tradition and ethnic identity by giving an opportunity for education to each person. Thus, the goals of these two movements are very different, but both are based on policymakers' views.

On the contrary, the third movement which recognises language as an asset is different from the previous two movements; it is based on an *individual* view. In the context of this third movement, Japanese language education can be a meaningful strategy of achieving a means for living in society. Traditionally, taking multiculturalism as an explanatory framework, the Japanese government's language policy has always been criticised, and the importance of native tongue education has been emphasised. However, if our point of view shifts from the policymaker's view to the individual's view, both Japanese language education and native tongue education are significant, depending on the context. In some contexts, the Japanese government's Japanese language policy is meaningful to newcomers, and in other contexts, native tongue education has a different meaning. This point of view raises a new paradigm within the context of multiculturalism (Sugimura, 2014).

Diversification of Newcomers in Japanese Society

As mentioned above, the meaning of language education can be affected by the individual, and the position of newcomers in Japanese society can be considered from a paradigm shift. Newcomers have been always categorised as one of the ethnic groups, i.e. Chinese, Korean, Japanese Brazilian, Japanese Peruvian, Filipino, etc., based on their ethnic roots. They have been characterised with a stereotypical view of each ethnic group. However, in a diversified society, considering that many newcomers come to Japan from many places and that they might move out of Japan again, it is very difficult for us to unilaterally define newcomers, because their

different experiences influence their view on language education. In fact, there is diversity of opinion among the newcomers; some insist to access education in their native tongue, whereas others prioritise Japanese language education to survive in a diversified and changing society. Kawakami (2006) proposes 'moving children' (*ido suru kodomotachi* [translated by the author]) beyond borders to explain a feature of the diverse newcomer children. Kawakami notes that newcomers move beyond borders and have experience living in many places. The borders are not only geographical, but invisible borders between school and home wherein newcomer children use Japanese at school and their native tongue at home, transcending language borders, giving rise to various educational needs.

Shibuya (2013) observes that the educational needs of newcomer students are too diversified to grasp; she proposes considering newcomers, not from the viewpoint of 'roots', but that of 'routes'. Shibuya focuses on the various educational needs of newcomer children by taking the case of a newcomer child who can hold a conversation in Japanese without any problems, but cannot learn well at school due to the inability to use Japanese as a language for learning. This kind of child is not a target of Japanese language education; however, considering the child's personal experiences and problems, how should the school teach and treat the child? The school and teacher must get rid of the preconceived thought that newcomer children cannot speak Japanese. Even if a newcomer child can 'speak' Japanese, the child may have problems studying subjects in Japanese, and in that case, the teacher should consider the student's personal issues. These differences of views come from their individual experience and opinions, and they depend on various 'routes' of the child's life. If newcomers have different experiences, their strategies of living can also diverge. Each newcomer has different characteristics, and even within the same ethnic group, persons may hold different viewpoints, and their individuality is not fixed or unchangeable.

Paradigm Shift of Language Education for Newcomer Students

The change of perspective on newcomers from 'roots' to 'routes' means that it is important to consider a context when discussing education for newcomers. Mabuchi (2011) explains this point by expressing a change from essentialism to constructivism on the topic of culture. Essentialism insists that culture has unchangeable features, such as an ethnic identity that is characterised by a fixed definition. However, Mabuchi observes that ethnic identity should be analysed in context and that although it is not fixed or unchangeable, it can vary and be reconstructed in social, political and economic contexts. Newcomer children cannot be categorised into one group, and exhibit several variations among themselves. Even within one group, e.g. Japanese Brazilians, newcomers exhibit many characteristics and educational needs based on individual life processes. Language education for newcomers should be designed considering the student's context and situation based on their 'route'.

Considering the realities of ethnic minority people's transcending nations, Sugimura (2015) observes that they demonstrate unique needs for language education. Language can be chosen as a strategy depending on the people's political, economic and social position, and this changing role of language should be considered a new function within the sphere of multicultural education, meaning that minority groups' needs should be understood from the perspectives of both essentialism and social constructionism.

Matsuo (2013) explains the paradigm shift from the different perspective of comparative analysis of education for foreign children and multicultural education in Japan. *The education for foreign students* in Japan has been aimed at the assimilation of each ethnic group, but the students have problems as they are not familiar with Japanese schools, and Japanese language can be the most important subject for them to adjust to Japanese society. However, considering the individual context, Matsuo proposes *multicultural education* instead of *education for foreign children.* The first purpose of multicultural education is to give each student an appropriate learning environment, considering various differences on ethnicity, gender, social class, sexuality, disability, age and so on. There are visible borders or barriers; however, as already mentioned, there are also invisible borders which surround children. Multicultural education can guarantee an opportunity for learning and the nurturing of scholastic ability of all students. The second purpose of multicultural education is to attach importance to diversity of culture. Each student should be given an opportunity to learn his or her native tongue and own culture. The third purpose of multicultural education is to grow in competency to live in a diversified society. This promotes students' abilities in cross-cultural communication and problem solving. These abilities are necessary for people to live together in a changing society. Finally, multicultural education should be a subject not only for newcomer or foreign students but for all students, including Japanese students. Matsuo proposed this system as *multicultural education as a universal design* in this diversified society of Japan.

Dilemmas and New Challenges of Multicultural Education Through Language Education Issues

The purposes of multicultural education are important factors for newcomers in Japanese education, but it must be observed that there is a dilemma between the first and the second purpose. The first purpose seeks to give each student an opportunity for learning, i.e. 'equality of opportunity', regardless of ethnicity, gender, social class, disability, age and so on. However, the second purpose is to differentiate each student's cultural factors and to prepare for a diversified programme to preserve each student's different culture. In that case, how can school education combine the practice of both purposes of multicultural education? In other words, the first purpose must give all students equal opportunity of learning, and the second

purpose must prepare for a different programme considering cultural differences and equity. It is important for us to find a balance between the first and second purposes to realise citizenship education in diversity education; both equality and equity should be considered to realise citizenship education for a culturally coexisting society.

The following case gives rise to a new perspective and flexible method of language education as multicultural education. As mentioned above, language is a strategy to obtain better chances at studying or jobs; it is a type of asset. In the case of Chinese schools which have introduced three languages (Chinese, Japanese and English), Chinese as the native tongue is still important to the Chinese people; however, they also regard English and Japanese as important assets for their work and education.

The same phenomenon appears at another school with a new concept of schooling. A school with Korean as a medium of instruction in Osaka also offers trilingual education, i.e. Korean, Japanese and English. Generally speaking, a Korean school is conducted in Korean and is expected to be an educational institution for the ethnic group to keep their ethnic identity, culture and tradition. It has attached importance to preserving Korean culture and language and imparting them to the next generation. However, the new Korean school in Osaka is based on internationalisation and aims to develop students to be active in the world. Their educational mission is to develop children as 'persons beyond borders', and while their main language is Korean, they can use English and Japanese to live and work in Japan and internationally.

Considering the purposes of multicultural education, this school guarantees all students an opportunity to learn and develop scholastic ability, fulfilling the first purpose. In contrast, the school maintains the traditional perspective of keeping culture and ethnic identity by adopting Korean as one of the languages of instruction. At the same time, it seems to attach importance to learning strategies for surviving in an internationalised world, and English and Japanese are also regarded as important tools as language as assets. This is a different factor of the second purpose of caring about cultural diversity; however, 'language as assets' is people's individual needs, which is a security for *equity*. People cannot be satisfied by being given an opportunity for learning, but they try to seek for a better language education which can be worth taking in their mind.

Looking back to the language education policy on newcomer students in Japan, the Japanese government accepts them in Japanese public schools and tries to give them Japanese language education. This means giving a learning opportunity to them as the first purpose; however, the government does not necessarily deal with the second purpose of diversity, and native tongue education is not a subject in Japanese public school education. This can be a way of assimilating newcomers into Japanese society from the traditional perspective of multicultural education. However, Japanese language education is one of the newcomers' educational needs with regard to 'language as assets' as well as the Japanese government's target. Newcomers are also concerned about native tongue education; however, they stress the importance of Japanese language education to obtain better jobs and education to live in Japanese society.

When piecing together these aspects of language education for newcomers in Japan, it can be observed that language education based on multiculturalism should still keep the individuality and identity of native tongue; yet, at the same time, it should consider the context of each case and which language and programme can be of worth to newcomers as assets for living.

Conclusion

The purpose of this paper is to rethink the significance of equity and equality of multicultural education through the case of language education for newcomers' children. The increase of newcomers in Japan since the 1980s has required the Japanese government to struggle with multicultural education. Japanese language education has been a main subject, while native tongue education is only supplementary. In Japanese education policy, *equality* of education means giving all students access to Japanese school education, including newcomer students. This is regarded as a process of assimilation to Japanese society, and there has been no native tongue education in public schools. However, native tongue education is allowed in some private schools for foreigners not recognised by the Japanese government. Native tongue education is important for foreigners to practice their culture, history and ethnic identity. Cultural identity in education is a foundation of *equity* of education and can guarantee their educational needs and cultural diversity.

However, recently there has arisen another movement of multicultural education in Japan. In this diversified society, newcomers' educational needs are various, and newcomers do not necessarily demand native tongue education. Some regard Japanese language as a way for them to obtain better education and better jobs. Japanese language is thus a type of asset, and some newcomers prefer learning it to learning their native tongue to survive in Japanese society. This cannot be understood from the traditional perspective of multicultural education; native tongue education should be a target to succeed. However, by focusing on newcomers' individual views, it can be observed that they seek a pragmatic way to live in Japan. While *equality* means giving an equal opportunity to all the people, *equity* reflects the individual demands based on many different factors. Even in the same ethnic group, newcomers' views have different characteristics, and each person's ideas and individuality are not fixed or unchangeable. Considering this reality of newcomers' individual demands, it is not enough to accord an *equal* opportunity to language education, but is more important to examine the meaning of language education considering their educational needs and contexts. In this case, we should avoid a fixed or stereotyped perspective of newcomers. It is not enough for newcomers to have the opportunity to learn their native tongue for *equality*; it is important for them to have a chance to choose to learn the languages which, in their opinion, are worth learning to achieve *equity*. We should aim to strike this balance between *equality* and *equity*.

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Chapter 7
'Bridges and Ladders': The Paradox of Equity in Excellence in Singapore Schools

Dennis Kwek, Rifhan Miller, and Maria Manzon

Introduction

While Singapore's education system has achieved excellence especially in terms of international educational assessments, the issue of equity remains underexplored and contentious. This chapter will examine the interplay of equity and excellence in Singapore's secondary schools. It will showcase best practices of differentiated schooling in pursuit of equity and the tensions that arise between inclusion and differentiation in the system.

Drawing on Fraser's (2008) framework for understanding social justice, we distinguish three distinct types of injustices – socio-economic, political and cultural/ symbolic – with corresponding forms of justice, redistributive, recognitive and representational, to resolve them. We then explore the Singapore education system that comprises a 'bridges and ladders' model of highly differentiated schooling. We examine three case studies of schools which exhibit, in microcosm, the tensions between equity and excellence in Singapore more broadly. They comprise a madrasah, a specialised school and an elite school. Through these case studies, we explore the pedagogical, sociocultural and systemic approaches that can affirm, transform or enhance equity and excellence in Singapore secondary schools.

We argue that the 'bridges and ladders' model, through its increased educational choices and differentiated schooling experiences, paradoxically increases equity and excellence while simultaneously exacerbating injustices and inequity. We situate the implications of educational equity and excellence in the continued political discourses of 'equity needs economic growth', meritocracy and educational

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choice. Finally, we propose a rethinking of the Singapore model to enhance the pursuit of equity for all.

Review of Research on Equity and Excellence in Education

All over the world, equity and excellence in education are a major concern. The Organisation for Educational Cooperation and Development (OECD) signals a shift towards 'providing education that promotes equity by recognising and meeting different educational needs' (2012, p. 17). Spurred by international benchmarks, educational policies in many countries have tried to combine a concern for equity in education – providing high-quality education and learning opportunities for students of different backgrounds – with a striving for excellence, stimulating outstanding performance and the development of specialist skills. Central to the debates around equity and excellence is the question of whether the pursuit of educational excellence is fully compatible with an equitable education system.

The issue of educational equity arose after World War II. On 10 December 1948, the General Assembly of the United Nations (UN) adopted and proclaimed the Universal Declaration of Human Rights (UN, 1948). Article 26 of this declaration focuses on an individual's right to education. Since then, universal access to education has been linked to the fight against poverty, discrimination, sickness, economic and social strife, racism and the lack of economic, social and cultural development. Access to education is now generally believed to raise an individual's chance to build a good life, find a suitable job, move up the social ladder and be well-prepared for the global knowledge economy. It is through education that societies can advance together, globally.

Indeed, this places a heavy demand and burden on the role of education in any society, and it needs to be asked if education can really work for everyone. Can education cater to the learning needs of all students, regardless of mother tongue, socio-economic background or parents' educational and occupational levels? Has the massification of education led to full democratisation as far as the acquisition of knowledge and skills are concerned? What have been the consequences of opening up education to all individuals and all layers of society? To what extent is the ambition to create powerful education for all, and offering all students, regardless of language, race or religion, maximal chances to develop a broad range of competencies truly compatible with the ambition to allow certain students the opportunity to acquire excellence in a limited range of competencies? Going further, Joseph Farrell (2013, p. 165) in his review of six decades of comparative evidence on educational equality asks: 'Can, or under what conditions, the school build a new social order? Can it at least provide opportunities for individual social mobility for at least some children of marginalised groups within a society?'

To begin to think through these questions require us to consider a number of definitions. Drawing on research on educational inequality and inequity, Jacob and Holsinger (2008, p. 4) define equality as 'the state of being equal in terms of

quantity, rank, status, value, or degree', while equity 'considers the social justice ramifications of education in relation to the fairness, justness, and impartiality of its distribution at all levels or educational subsectors'. Both are intertwined as the notion of 'equal' requires considerations of fairness and justice. For example, Demeuse, Crahay and Monseur (2001) point out that educational equality and equity have shifted the debate from the *right* to an education as enshrined in the UN declaration, to the *duty* of education. They further specify, that equity and equality need to be considered within a systems framework of inputs, processes, outputs and actualisation (2001, p. 70):

- *Equity of access or equality of opportunity*: Do all students (or groups of students) have the same chance of progressing to a particular level in the education system?
- *Equity of learning environment or equality of means*: Do all students enjoy equivalent learning conditions? Do disadvantaged students benefit from a learning environment equivalent to advantaged students in terms of teacher quality, professional credentials, enrolment rate, quality of school infrastructure, quantity and quality of teaching?
- *Equity in production or equality of achievement (or outputs):* Do students all master with the same degree of expertise, knowledge or skills the goals of the educational system? Are students from different social backgrounds given, over the period of instruction, equal skills?
- *Equity of realisation or exploitation of results*: Once students leave the education system, do they have the same chances of using their acquired skills and knowledge to actualise their goals in society?

This nuanced understanding of the different leverage points where equity can be exercised within an education system shows how complex the issue of educational equity can be. Since the post-war period, research into educational equity started showing that ensuring a mere right of access to education for all did not automatically result in the enhancement of social and racial equality. Studies have persistently shown that socially disadvantaged groups of students who had been denied access to education in earlier ages are still not granted access to academic secondary education, higher education, or prestigious schools when compared to children of highly educated parents (e.g. Coleman et al., 1966; Farrell, 2013; Lucas, 2001; Pfeffer, 2008; Van de Werfhorst & Mijs, 2010).

Research further suggests that inequity exists at the level of educational output: socially disadvantaged students show systematically lower levels of performance in key disciplines in compulsory education and lower success rates in higher education. They have been shown to develop lower levels of competencies in basic academic outcomes relative to children of parents who were highly successful in education themselves. Coleman (1968) classifies five types of inequality: (1) differences of the communities' inputs to the school; (2) racial composition of the school; (3) various intangible characteristics of the school; (4) consequences of the school for individuals with equal backgrounds and abilities; and (5) consequences of the school for individuals of unequal backgrounds and abilities (pp. 16–17). Forty years

after the publication of the Coleman report (Coleman et al., 1966), Gamoran and Long (2006) concluded that (a) schools in the United States are still highly segregated along racial and ethnic lines and (b) that there are still major achievement gaps between Black and White students and between students of low and high socio-economic status (SES). In many countries, students from a socially advantaged background still have the best chances to be successful in education, while students from a socially disadvantaged background run a serious risk of not, or insufficiently, developing the competencies necessary to succeed in secondary and post-secondary education and to succeed and further develop in life after compulsory schooling.

Importantly, at the heart of the debate about equity and equality is the idea of meritocracy: the idea that everyone, regardless of class, race or gender, should have an equal chance to perform well in school and ultimately obtain more highly rewarded positions in society (Gewirtz & Cribb, 2009). Whether they do or not then depends on the students' effort, persistence and initiative rather than on static background factors such as gender, parental SES, mother tongue or cultural or religious background. At first sight, such an educational system would provide greater opportunities for able and hardworking children from lower-status families to move up the social ladder. Simultaneously, children from higher status families would have to prove themselves in school if they wanted to maintain their benefits, thus allowing education to break down the intergenerational reproduction of the social divide.

However, inequities begin to appear when the meritocratic imperative comes up against an education system where relative performance (how a student performs relative to other students) and a limited positional good (certain schools, pathways and trajectories are preferred over others) are the norm (Low, 2014). In any industrialised society, schools assume a central position in the process of sorting and allocating people to appropriate jobs (Brint, 2006). Obtaining educational degrees has become a crucial condition for people to find good jobs. Indeed, a key goal of mass education is to award credentials that help people find work and increase the number of highly skilled workers required in global knowledge economies. Educational credentials have therefore become a positional good and play the stratifying role that family resources and family reputation once played. Educational attainment is regarded as a more important determinant of an individual's chances of building up a good life than family background. When credentials become a valuable societal asset, competition for a limited resource (not all students can graduate with degrees) compels individuals to go beyond mere effort to developing strategic advantages over others, such as private supplementary tuition or increased access to cultural and social capital needed to gain a competitive edge. This singular preference for educational credentials, achieved through academic performance, has been shown by research to generate inequities because it does not match the meritocratic ideal of an education system in which all children learn and develop through their own means (Bray & Kwo, 2013; Chua & Choy, 2014; Ng, 2015). Solutions such as increasing access to valued credentials or mobilising expert teachers to improve student academic performance obfuscate the complex and contested nature of how inequities emerge systemically. In working

through these complexities, it is useful to have a framework to guide our thinking. Such frameworks may not provide easy answers to complex questions, but they at least help start the process of thinking how they might be answered. A useful framework is provided by the philosopher of social justice, Nancy Fraser, who points to three interacting dimensions of equity – distribution, recognition and representation (Fraser, 2007, 2008).

Fraser's Equity Framework

It is difficult to ensure that all citizens have an equal opportunity to succeed through education. Students from diverse backgrounds may have unequal access to learning resources because of socio-economic status quos. Socially under-represented groups tend to be under-served, and the lack of inclusivity in an education system may perpetuate achievement gaps in a society. According to Fraser's (2007) theoretical framework of *Participatory Parity*, social arrangements must be in place to ensure greater equity between groups in a society so that all can participate on an equal footing. This is because various institutionalised obstacles prevent certain groups from fully participating. Fraser's (1998) initial framework for social justice argues that equity needs to be considered in light of two interrelated dimensions of social justice: *recognition* (cultural-symbolic) and *redistribution* (socio-economic). Fraser (2007, 2008) further developed her theory to include *representation* (political) as a third dimension. These concepts are elaborated below.

Recognition refers to the social representation of various social groups as a form of cultural and symbolic justice (Fraser, 2008). It alludes to the recognition of status ideologies, perceptions and norms within a society that create cultural hierarchies between different groups of people. This gives rise to an uneven classification of groups and the perceived cultural and social values placed on these groups. Social interpretations and communications then subject these affected groups to varying levels of social misrecognition, disrespect and discrimination, among others. This then negatively affects the self and social esteem of minority and marginalised groups.

Redistribution refers to the distribution of material resources between groups in a society as a form of socio-economic justice. Misdistribution of resources may occur as a result of varying socio-economic gaps in the class and economic structures of a society. Income inequality and lower standards of living, for example, may lead to inadequate material resources reaching these groups. They are thus denied various resources required to participate in societal and economic life on an equal footing. These gaps may also be further perpetuated by cultural-symbolic issues of *recognition* as mentioned above, where affected groups are also denied resources because of, for example, their marginal social standing (Fraser, 2008).

Representation refers to the capacity for minority and marginalised groups to participate fully in social and political dialogues, as a means of self-representation (Fraser, 2007, 2008). Because they are socially under-represented, they are less

visible within the wider society, their voices are denied from being heard, and they are also unable to influence social and political decision-making.

Fraser's framework will be used as a lens to analyse the achievement of equity in Singapore's education system. The following sections briefly describe Singapore's educational landscape and examine government discourses on the spirit and mechanisms that have been introduced into the system to promote social justice. These provide the setting for the three case studies which are examined through the lens of Fraser's equity framework.
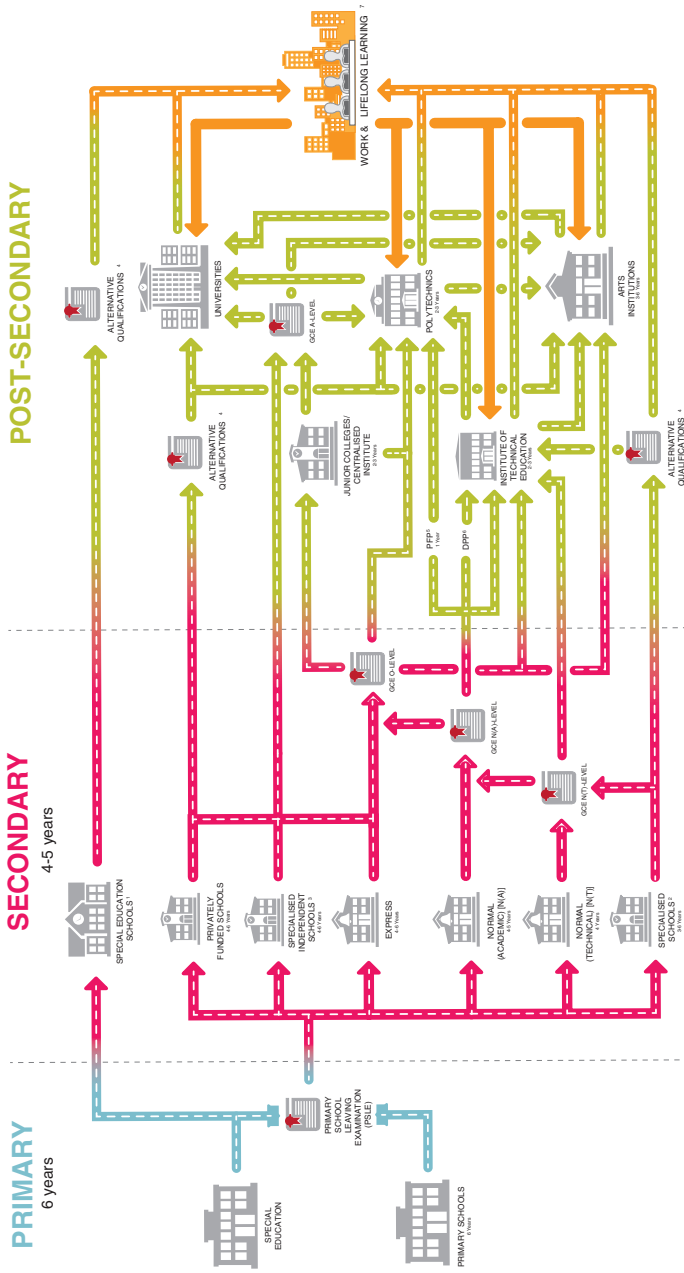
Singapore's Diverse Educational Pathways

Singapore's educational landscape is one that not only reflects the cultural and ethnic diversity of its student population but also the presence of a variety of educational settings designed to offer equitable opportunities for all. Singapore has 182 primary schools and 154 secondary schools (MOE, 2015a). Primary education at national primary schools is compulsory for school-age children who are Singapore citizens and reside in the territory. Exempted from this provision are those children with special needs and those who wish to either be home-schooled or attend designated schools, such as the madrasahs. The system has been moving towards greater flexibility and diversity in recent years. Concretely, secondary education currently offers a range of choices in terms of core courses and school types. Three courses are offered at the secondary level, depending on the student's results in the Primary School Leaving Examination (PSLE). They are the Express (including Integrated Programme [IP]in some schools), Normal (Academic) [N(A)] and Normal (Technical) [N(T)] courses. A recent initiative allows students to opt for a lateral transfer to another course that is more suitable to their learning pace and style. There are six types of secondary schools, namely, autonomous schools, independent schools, Special Assistance Plan (SAP) schools, specialised independent schools, specialised schools and specialised schools for Normal (Technical) [N(T)]-eligible students (MOE, 2015b). The Singapore education system thus offers many choices and pathways for its students. Figure 7.1 provides an overview of the Singapore education system's diverse pathways model.

Bridges and Ladders: Building Equity Through Multiple Pathways

At the Ministry of Education (MOE) Work Plan Seminar on 2 October 2007, the then-Minister for Education Tharman Shanmugaratnam highlighted the need to inject 'fluidity into our ability-based system of education' to attempt to 'blur the lines between the different streams and maximise the interactions between students

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Fig. 7.1 The Singapore education landscape. (Source: MOE, 2015a, p. 2)

so that they do not get the sense that they are separate from each other, and do not box their aspirations in' (Shanmugaratnam, 2007). He pointed out:

> We have an ability-based system, but it is one that opens up ladders all along the way, so that it is driven by each student's aspirations. We are not saying "this is what you are capable of, and this is as far as you can go". What we are saying is "let's help you find your strengths, and help you get to where you want to go". We must keep enough flexibility in the system, keep open the *bridges and ladders* [italics added] and make sure there is always space for aspirations, so that every Singaporean feels encouraged to try hard and go further. Some will take a longer path to get to where they want, but they often end up stronger (Shanmugaratnam, 2007).

This is arguably the first mention of the 'bridges and ladders' metaphor used to describe Singapore's education system. The system comprises multiple pathways to cater to the varied strengths and needs of students and provides more options for students at different stages of education. The metaphor is used to signal that the system is flexible and allows for not only vertical movements – ladders – up the educational landscape (primary to secondary to post-secondary and so on) but horizontal or lateral movements, bridges, across levels so long as students work hard and strive for excellence in their studies. This was reaffirmed by the then-Minister for Education Heng Swee Keat in 2012, linking a calibrated system that matches student interest, ability and learning disposition, with student effort to aid movement:

> We seek to match the strengths and aptitudes of each student to help them achieve their potential. This does not necessarily mean that everyone gets to do the course of his choice, as entry into specific programme is competitive to maintain rigour and standards. What we seek to do is to have bridges and ladders linking the multiple pathways, so that success at one stage allows one to connect to the next stage—there is no dead end, as long as one strives. (Heng, 2012)

This multiple pathways model extends beyond schooling and into work (Shanmugaratnam, 2012), where opportunities are provided for employees to undergo different types of training to ensure they continue to be employable.

Central to the bridges and ladders model are a number of key characteristics:

- The system allows for highly differentiated schooling experiences for students, a clear move away from a common and centralised form of school experience that students encountered in the early years of Singapore's education development.
- The premise is that through a flexible pathway model, the system can move away from a linear progression 'pipeline' model (McCarty, Brayboy, Datnow, & Hamann, 2013). The pipeline model assumes that the system has limited resources, and hence only a few highly valued pipelines exist for the system to channel students through. Crucially, the pipeline model directs attention to these desired routes and how competitive schools, parents and students have to become to gain access to these routes.
- Another assumption is that through a flexible pathway model, social mobility for students will be enhanced because students are provided ample educational opportunities and support throughout the different levels of the system.

- The flexible pathway model is also dependent on the meritocratic impulse of students to work hard and be motivated to excel up the levels in the system so that 'as long as one strives' (Heng, 2012), the system will provide ways for students to move up at their own pace.

Indeed, the bridges and ladders model, as a move away from the pipeline model, is seen to be a key enabler of social mobility. However, given the decades of Singaporeans gaining success (or failure) through the pipeline model, there is a need for a significant shift in cultural mindset among parents and students. Heng acknowledges that 'Singapore needs to make the transformation from a "scarcity mentality" that focuses on a single pathway to success to an "abundance mentality" with multiple pathways' (Heng, 2015). It is unclear how realistic it is to move the citizenry to adopt an abundance mentality.

Equity In Actu: Case Studies of Singapore Secondary Schools

This section examines the case of a madrasah, a specialised school for Normal (Technical) [N(T)] students, and an independent school, as contexts which provide alternative educational pathways from Singapore mainstream schools. They are interesting units to analyse how equity can be achieved by offering more choices, catering to the diverse abilities, needs and interests of students to develop them to their full potential.

Singapore's madrasahs cater to students pursuing both religious education (Islamic) and the mainstream curriculum. The distinct Islamic identity of the madrasah has frequently raised debates over the ability of its curriculum and students to integrate and assimilate into the larger Singaporean society. Meanwhile, specialised schools for N(T)-eligible students offer students from the Normal (Technical) stream, which represents students with the lowest PSLE scores. Many of these students face social stigmatisation from being banded into this academic stream. Independent schools cater to intellectually gifted students. They create a conducive space for students to be cognitively stretched and to acquire social and cultural subjectivities that nurture them to become ethical and responsible leaders in the future.

Social justice in education prompts the collective recognition that all students, regardless of their socio-economic background, deserve quality education and resources to learn effectively. However, not all schools are equally represented in this policy initiative. The three examples below do not make up the majority of mainstream schools in Singapore. They cater to a minority of students who choose to take up an alternative educational route.

Singapore Madrasahs

Originally set up by Muslim philanthropists in the early 1900s, there are six madrasahs in Singapore, catering to primary, secondary and pre-university education. Singapore madrasahs enjoy significantly more autonomy in determining their curriculum than their mainstream counterparts, which follow MOE curriculum guidelines. Madrasah education has become increasingly centralised under The Majlis Ugama Islam Singapura (MUIS), also known as the Islamic Religious Council of Singapore (Abu Bakar, 1999).

The madrasahs traditionally have little direct contact with the Ministry of Education (MOE) and instead maintain traditional links with overseas Islamic institutions. Because of this, the madrasah has frequently raised debates over the ability of its students to assimilate into multi-ethnic Singaporean society. In addition, the state was also concerned that upon graduation, madrasah students were not academically equipped to reintegrate into a working society that favours knowledge workers (Abu Bakar, 1999). At their lowest point in the 1970s, when madrasah education was seen as carrying little economic value, its enrolment plummeted, becoming a place of last resort for those who struggled with mainstream education (Abu Bakar, 2009).

Today, madrasahs in Singapore place emphasis on both secular and religious learning while maintaining their distinct religious identity. These features make them progressive and relevant to the academic needs of Singapore students who seek an education that integrates religious knowledge with formal and mainstream education. In addition to their GCE 'O' level subjects, madrasah students typically undertake seven additional Islamic subjects in Arabic. While this may prove academically demanding, this dual education system provides its students with educational choice: to remain in the religious academic track, where they may pursue further religious scholarship in prestigious Islamic universities in the Middle East, or to reintegrate into mainstream education later on. In addition, The Joint Madrasah System (JMS) marks a restructuring of the madrasah curriculum. It allows for greater centralisation within the madrasah schooling system and continuity between the madrasah and mainstream curriculum (Kassim, 2008). This helps to ensure the continued relevance and attractiveness of madrasah education.

Singapore's mainstream media has reported the outstanding academic achievements of madrasah students succeeding in obtaining places in, or graduating from, overseas Islamic universities, as well as from the local universities. These reports help to improve the social standing of the madrasahs that they are just as good as, if not better than, the national schools. The reports show that madrasah graduates have succeeded in obtaining a comprehensive education not limited to religious studies, but also secular knowledge (Abu Bakar, 2009). For example, the National University of Singapore's (NUS) highly competitive medical faculty has recently admitted two madrasah alumni (Teng, 2015), and another was reported to have scored nearly perfect grades in NUS (Lee, 2014a). Primary-level madrasahs have also seen students graduate with outstanding PSLE scores (Lee, 2014b; Teng, 2014).

As private learning institutions, madrasahs receive little public funding (Abu Bakar, 1999) as compared to mainstream schools. Because of this, madrasahs typically lacked, for example, technological teaching tools and teacher training. Its teachers also earn significantly less than those in mainstream schools (Ibid). Over the years, however, greater access to training and professional development has been given to madrasah teachers. In 2007, collaboration between MUIS and NIE (National Institute of Education, Singapore's sole teacher education institute) began, giving madrasah teachers access to teacher training in NIE through a specialist diploma in teaching and learning. Over the past decade, specialist teacher qualifications for madrasah teachers have increased from 16% to 94% (Mohamad Salleh, 2014a). This reflects an increasing redistribution of resources, a move to help madrasah teachers keep up with teachers in mainstream schools. Redistribution of funding is also prevalent. For example, the state recently extended the use of *Edusave*[1] for madrasah students (Chan, 2013) who, as students of private educational institutes, were previously not entitled to it. MUIS also launched Promas (Progress Fund Madrasah Assistance Scheme) in 2010 to help madrasah students from low-income families. Promas also grants bursaries for academically outstanding madrasah students (Mohamad Salleh, 2014b). In addition, Singapore Prime Minister Lee Hsien Loong announced in his 2015 National Day Rally speech in Malay that the government would work with MUIS to provide financial support to upgrade madrasah teachers teaching secular subjects like mathematics and science and fund awards for students who perform well in them (Lee, 2015).

Within the broader community, representation of the work and influence of Singapore's madrasahs within the region can also be felt. On 23 April 2009, a New York Times article described a Singapore madrasah as revolutionary and progressive for its ability to combine lessons on globalisation and a religious ethos, functioning as a model for other madrasahs (Onishi, 2009). Its excellent curriculum and administration have also influenced other madrasahs in Asia, especially those in Indonesia. For example, one madrasah is part of a long-term programme, providing consultancy to help set standards in madrasah education and a new global school in West Java (Temasek Foundation, 2012).

Specialised Secondary Schools for Normal (Technical) Students in Singapore

Specialised Normal (Technical) [N(T)] schools are full-time, private co-educational institutions that focus on secondary school education for students eligible for the N(T) course in Singapore. N(T) schools enjoy the freedom to customise their

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[1] Singaporeans between the age of 6 and 16 at the point of school admission will automatically be given an Edusave account and receive a yearly contribution until they reach 16 years. Students who qualify may use the Edusave fund to pay for enrichment programmes or to purchase additional learning resources allowed by the scheme.

curriculum to suit the learning needs of their academically weaker students by integrating both academic learning and vocational training, offering both N(T) subjects and the ITE[2] Skills Certificate (ISC) courses in four areas: Hospitality Services, Retail Services, Facility Services and Mechanical Servicing.

The Normal (Technical) stream represents students with the lowest PSLE scores in Singapore. For a student in a competitive educational landscape such as Singapore, being placed in an academic stream with the nation's lowest scorers may be socially stigmatising. Parents struggle with this, and one of the N(T) schools' predominant missions has been to discourage negative attitudes towards an N(T) education.

Even though N(T) students may face difficulties coping with the mainstream school curriculum, N(T) schools provide them with an alternate educational pathway. Students less academically inclined may find their strengths in hands-on learning, in an institution that also provides them vocational training. MOE has recently allowed students posted in the Normal courses to take subjects that they have performed well for the PSLE at higher levels from Secondary 1 (MOE, 2013). This allows N(T) students to excel in subjects they are academically stronger in.

However, there are still negative perceptions about the life prospects of students in weaker academic streams, and this must be addressed. For example, one principal was quoted as being on a mission 'to help parents understand that there is a good future for a child who undergoes vocational training' (Lee, 2013a). This is important because N(T) schools ensure that these students do not get left behind by the education system. They not only help lower the attrition rate of students who underperform at the PSLE but are also given the opportunity to perform on a more level playing field, subsequently increasing their self and social esteem.

The N(T) schools adopt a customised approach towards their curriculum, opting for more hands-on learning, set within real-life contexts to prepare students for vocational training and entry into the workforce. They also adopt innovative practice-oriented teaching methods to strengthen students' literacy and numeracy foundations. Applying their knowledge in real life is complemented with specialised infrastructure on campus for its students (MOE, 2015b, p. 9). The N(T) schools are fortunate to tap into various learning resources. One N(T) school has 26 partnerships with various organisations and individuals (Lee, 2013b). For example, Home-Fix, a local DIY home improvement retail brand, has set up a retail training room within the school compound, helping the school provide an authentic learning environment for its students.

N(T) schools also provide a second chance for many students whose learning had been disrupted for reasons out of their control. For example, a child who had dropped out of school at age 10 to take care of his ill mother had enrolled himself in a N(T) school. He eventually moved on to study polytechnic education (Lee, 2014c). Success stories such as this exemplify how N(T) schools aim to provide students

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[2] The ITEs (Institute of Technical Education) are post-secondary institutions in Singapore providing technical and vocational training. It is formerly known as the Vocational and Industrial Training Board (VITB). The ITEs offer the National ITE Certificate (NITEC), Higher NITEC, Master NITEC and various diploma programmes.

with greater access to basic education and higher education. Another N(T) school even initiated a mentorship programme for its higher potential students with Yale-NUS undergraduates, to help inspire them (Ng, 2014).

An N(T) school also adopts the Duke-NUS TeamLEAD (Learn, Engage, Apply, Develop) learning innovation, with the school's mathematics head of department, working closely with Duke-NUS TeamLEAD on the school's adaptation of their model of team-based learning (Ng, 2013). As part of the school's initiative to customise its pedagogy to suit the learning needs of its students, this school adopted learning innovations such as Productive Failure and Flip Lessons and utilises ICT in its teaching and learning (Ibid). Despite having academically weaker students, the teachers do not hold negative beliefs about them (Valencia, 1997). In fact, through these pedagogical initiatives, the students constantly encounter a curriculum that is relevant and challenging. Teachers have high expectations and a strong positive attitude that their students can succeed in life despite the odds.

An Independent School (IS) in Singapore

Independent schools were established in 1988 to provide greater autonomy in curricular innovation, implementation of school programmes, administration, student admission and the setting of school fees (MOE, 2015b). As an independent all-girls secondary school, IS[3] enjoys autonomy in staff deployment, finance, salaries, management and curriculum. The school admits only the top percentile of each cohort of primary school leavers for a 4-year secondary school education, with most students having middle- and upper-income parents. In the early 2000s, the school transitioned from preparing students for the GCE 'O'-Level examinations to an MOE-initiated 'Integrated Programme' (IP) that provides a seamless 6-year 'through-train' education, culminating in the GCE 'A'-Level examinations. Without the 'O'-Level examinations, IP allows students to experience a flexible education which engages in broader learning experiences and outcomes.

IP was a response to the *Thinking Schools, Learning Nation* reform initiative in 1997 and a major education review in 2002 that implemented policies to foster greater diversity and flexibility in the system to accommodate the varying interests and abilities of students. In addition to consistently excellent academic outcomes, the school has established itself as a leader which is future-oriented, progressive and highly valued by teachers, parents, students and policymakers. In an independent programme evaluation of the Integrated Programme in the school, educational researchers found that across a range of indicators of good pedagogy and curriculum design, IS outperformed most mainstream secondary schools (Taylor, Kwek, & Foo, 2011). This was largely because the school redesigned its entire curriculum, assessment and instructional practices to implement IP. The whole-school transformation occurred over a span of almost 9 years, guided by strong school

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[3] The school name is a pseudonym.

leaders and a coherent innovation trajectory that focused systematically on curricular, pedagogical and sociocultural innovations. At the start, the principal re-envisioned educational outcomes for the school, including rethinking new future-ready student identities to drive curricular aims. An Understanding by Design framework (Wiggins & McTighe, 2005) was used to generate challenging, authentic student tasks and to frame key disciplinary ideas in all subject domains.

Pedagogical innovations were deliberately and coherently implemented that resulted in significant shifts from a traditional focus on examination preparation and curriculum coverage to a constructivist and personalised focus on student-centred learning. This ranged from equipping students with skills to do well in high-stakes examinations to preparing students with the knowledge, skills and dispositions required for the twenty-first century. It is not uncommon to find inquiry-driven, dialogic, critical and creative lessons in the school across all levels. The focus for student learning is on both academic and non-academic competencies. These are made possible because the school leaders focused on sociocultural innovations that enhanced teacher capacities and professionalism. Firstly, distributed leadership was implemented while maintaining top-down leadership needed to ensure a systemic school-wide, school-deep transformation. Multiple professional learning communities were formed to manage the learning processes as teachers struggled together in the transformation process. An in-house professional development academy was created to ensure all new teachers undergo a mandatory 3-year programme that provides them with information on the rationale for the changes. The programme encompasses the vision, values and culture of the school and the necessary skills, knowledge and dispositions to teach in this student-centred environment. There was also a strong emphasis on student leadership and creating close collegial relationships between leaders, teachers, students and parents.

The strong professional school culture in IS enabled teachers to always have high expectations of the students. This has two implications: firstly, the school focuses on the enactment of high-expectation curricula in everyday practice (Dudley-Marling & Michaels, 2012). In IS, this entails continuously upping intellectual demand and generating substantive engagement with curriculum knowledge and discourses. Secondly, rather than holding on to low expectations and subsequently, negative beliefs about the abilities of their students (Valencia, 1997), the teachers have an adopted form of 'additive thinking', possessing positive beliefs and high expectations of their students.

Diverse School Contexts: Similar 'Additive' Approaches

Across the three case schools and indeed throughout the education system, there is a systematic effort to provide Singapore students of varying abilities, talents, learning pace and styles, with multiple roads to educational success. This opening up of horizontal and vertical pathways in the educational system has happened over the past decade, in a move away from a one-size-fits-all education approach for

Singaporean students (Lie, 2013). Furthermore, in these case schools, teachers and school leaders not only recognise student diversity and abilities. They hold very high expectations and 'additive' beliefs about their students, regardless of the socio-economic background of their families. This translates into a customised curriculum for students and generates high levels of engagement with content and skills that are calibrated to ability, interest and ways of remaking the social life worlds of the students. The schools are also able to create spaces where students have opportunities to experience and learn from authentic, engaging tasks and constantly push the students intellectually.

Speaking in the context of Australia, Allan Luke links teacher beliefs and expectations with student performance through a self-fulfilling vicious cycle:

> Low expectations are part of a toxic cocktail of cultural stereotypes, structural racism, ignorance of students' cultural and linguistic community resources, and systemic practices such as streaming and tracking in schools that deters the achievement of indigenous youth (Luke, 2012, p. vii)

This is exemplified in the work *Pygmalion in the Classroom* (Rosenthal & Jacobson, 1968). It shows that teacher expectations influence student performance: positive expectations influence performance positively, and negative expectations influence performance negatively. Known as the Pygmalion effect, when teachers expect certain behaviour and attitude from their students, they are likely to act in ways that make the expected behaviours more likely to occur. The experiment was conducted by Rosenthal and Jacobsen on primary students who took intelligence pretests. After the tests, they informed the teachers of the names of 20% of the students in the school who showed unusual potential for intellectual growth and would excel academically within the year. Unknown to the teachers, these students were selected randomly with no relation to the initial test. When Rosenthal and Jacobson tested the students 8 months later, they discovered that the randomly selected students performed exceedingly well. In other words, the effects of 'additive thinking' on pedagogical practices and student achievement are real. These case schools exemplify how a positive Pygmalion effect helps teachers and students to create a pedagogical space where students can experience maximal learning. In a sense, this is made possible because of the highly differentiated schooling experiences created by the multiple pathways through the so-called 'bridges and ladders' education system in Singapore.

Paradoxes of Equity in Singapore's Bridges and Ladders System

The three case studies demonstrate that a key feature of educational equity and excellence in Singapore is to provide curriculum and instruction to students carefully calibrated to their abilities and interests, rather than their assumed developmental age. Pedagogically, providing high-expectation curricula and authentic, engaging

tasks for students from diverse learning abilities and backgrounds is crucial in transforming their educational experiences and generating positive educational outcomes. However, systemic considerations beyond the classroom may impact equity. In particular, this section considers the implications of the flexible pathways through the system.

Differentiation and Social Mobility

The bridges and ladders multiple pathways system aimed to ameliorate the problem of educational wastage, such as that in the early years of Singapore's independence, when there was a high rate of premature school leaving and a failure to achieve expected educational standards (Goh & Gopinathan, 2008). By having multiple pathways, students have increased options and opportunities to progress through the education system to acquire knowledge and skills useful for Singapore's rapidly growing economy. It is believed that education can be a strong source of social mobility due to its meritocratic imperative and a highly flexible system that creates many pathways for success. However, Ng (2015, p. 31) argues that this highly differentiated system 'looks to have segregating effects that are detrimental to mobility'. Drawing from international research, Ng argues that:

> [A highly decentralised and differentiated system] will result in richer students attaining higher levels of qualification, [while] the expansion of university places and decrease in tuition fees subsidy also serve to reinforce income advantages intergenerationally. (Ng, 2015, p. 39)

Tan argues that while there is social mobility in Singapore, as evidenced by local researchers analysing large administrative datasets, an argument can still be made that 'class origin does to some extent, even significantly, determine class destiny' (2015, p. 46). Opportunities for social mobility therefore decrease as one moves down the social ladder, and while there are outlier instances of individuals who, despite class origins or difficulties, are able to move up the social ladder and become successful economically, it is 'not highly probable' (Tan, 2015, p. 46).

Abundance Mentality and Examinations

Former Minister for Education Heng asked Singaporeans to shift to an 'abundance mentality' which recognises the value in different pathways rather than a singular academically oriented pathway focused on examinations as gatekeeping mechanisms along the path (Heng, 2015). Prior to this, major educational policy initiatives such as *Thinking Schools, Learning Nation* (TSLN) in 1997, *Teach Less, Learn More* (TLLM) in 2004 and *Curriculum 2015* (C2015) in 2008 were partly implemented as attempts to shift the system away from an examination-preparation culture

towards a student-centred learning culture. However, given that the national examinations for Primary, Secondary and Junior College levels are still pen-and-paper-based and high-stakes in nature (how students perform effectively decides which schools or universities they enter), teachers and schools are unwilling to change tried-and-tested pedagogies known to be effective in generating respectable examination outcomes. Chua and Choy (2014, p. 184) point out:

> … an effective education is one that has to take into consideration the various definitions of success by including more effective pedagogies and different modes of assessment and examinations. For example, although TSLN, TLLM and C2015 initiatives advocate a qualitative change in the education system, in reality the goals of these reforms are not in line with the assessment and evaluation of the student learning. This is because examinations are still used as the meritocratic tool to provide Singaporeans a fair chance to success since different people are given different abilities. And because the yardstick of success in Singapore is still reliant on academic performance, the objectives of TSLN, TLLM and C2015 will naturally be constrained by the examination-oriented environment.

It is difficult to shift the societal mindset towards an 'abundance mentality', especially given that academic performance and educational credentials are still highly valued assets perceived to aid in social mobility and provide students with a good life and future. Furthermore, the meritocratic imperative underlying the education system shifts the onus of effort to individuals to perform well within the system to move through the pathways. However, this can be hampered by class background, and deficit beliefs and expectations of teachers of their students' abilities.

This is not to say that the Singapore government does not acknowledge the systemic challenges of trying to create equities within an already excellent education system. There are two broad policy strategies for tackling equity (Benadusi, 2001):

- The more schools compensate for society in providing opportunities for students from different backgrounds, the more equity is guaranteed.
- Policies that are aimed at modifying the factors affecting the generation of educational inequalities, mainly via family social status, in order to increase equitable conditions.

The case schools are examples of the first strategy, where different types of schools are created to increase opportunities for students from different backgrounds to experience education and acquire much needed knowledge and skills for their economic future. Furthermore, international research on educational equity suggests that there are opportunities that can be offered by the education system that may enhance equity:

1. Equalise the quality of educational service provided by schools.
2. Eliminate or weaken various kinds of hierarchical differentiation in schools (such as streaming).
3. Establish forms of non-hierarchical differentiation of pedagogical practices aimed at a better match with different groups' learning styles and motivations.
4. Make SES composition of schools and classes more heterogeneous.
5. Extend pre-school education.

6. Extend second chance education (remedial courses, reverse curricula – curricular proceeding from vocational towards general education).
7. Provide grants and loans to children of low-income parents (Benadusi, 2001, p. 59).

It is important to note that a number of these opportunities are provided in the current system. For example, there are policies that attempt to blur the boundaries between different academic streams and make schools and classes more heterogeneous. Likewise, the government now pays significant attention to pre-school education and offers grants and subsidies to students that need them.

Conclusion: Rethinking 'Bridges and Ladders' in Pursuit of Equity for All

This chapter commenced with a brief review of the global discourses on educational equity. Employing Fraser's equity framework (2007, 2008), it analysed the cases of three Singapore secondary schools as to how these enacted the principles of recognition, redistribution and representation of sociocultural groups of students with diverse backgrounds, abilities, learning interests and styles. These case schools exemplify, in microcosm, the spirit behind the Singapore government's initiatives to promote social justice through an education system that recognises multiple pathways to human development. Such efforts, however, exhibit a paradoxical 'double effect' of achieving equity and excellence while reinforcing intractable pathologies of inequity in the system. These contradictory outcomes of reforms to achieve fairness in the education system are not unique to Singapore. They echo similar patterns in Hong Kong where elitism has arisen from equity policy initiatives (Lee & Manzon, 2014). They also resonate with 60 years of comparative evidence worldwide as demonstrated by Farrell (2013), who ultimately argued that advances in educational equality (and equity) have not been the result of educational reform but of 'economic growth or social structural change outside the realm of the school'. The equity-inequity dyad is thus a result of complex processes at work from individuals to schools to the system that are linked within what Ainscow, Dyson, Goldrick, and West (2012, p. 141) call an 'ecology of equity':

> This suggests that the extent to which students' experiences and outcomes are equitable is not dependent only on the educational practices of their teachers, or even their schools. Instead it depends on a whole range of interacting processes that reach into the school from outside.

In addressing issues of equity and excellence, perhaps the first task is to reconsider the metaphor of 'bridges and ladders'. Instead, a more suitable metaphor may be to think of the system as akin to the 'snakes and ladders' game. In the game, players compete by moving horizontally and vertically to progress up the game board towards the goal at the top. However, there are 'snakes' that can impede progress and force players to move backwards by several steps, preventing them from

reaching the goal. The 'snakes and ladders' metaphor makes obvious the presence of structural impediments to social mobility and educational progress: leaks and drops in the system that would otherwise be invisible in the 'bridges and ladders' metaphor. The second task is for teachers, school leaders and policymakers to ask the following three questions that correspond to Fraser's (2007, 2008) social justice framework:

1. *Who gets what?* This pertains to redistribution. How are educational opportunities, resources and outcomes distributed between individuals and across groups? Are there justifiable reasons for that distribution, or is it arbitrary, or shaped by factors that should play no part?
2. *Who is treated in what way?* This relates to recognition. How far are learners valued equally? Are their differences respected and welcomed, or is there a hierarchy of valuing in which some characteristics and cultures are more valued than others?
3. *Who can do what?* This relates to representation. Who has the power to make decisions, and how far can learners shape what happens to them? Does the education system enable learners to be and do what they value, or does it place limits on the real choices that some, or many, can choose to make?

Asking these questions forces us to consider how the complex issue of equity and excellence is not an abstract matter best left to policymakers and the government. Rather, at the school level, a significant challenge for teachers is to turn discourses of social justice – issues of redistribution, recognition and representation – into face-to-face relations and knowledge practices that impact students' lives, aspirations and pathways. Asking these three fundamental questions and taking an ecological perspective on the issue of equity and excellence is, we believe, a productive way of continuing to improve Singapore education towards a balanced, equitable and excellent system.

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Part II
Striving for Equity in Excellence:
The Singapore Experience

Chapter 8
Equity and Meritocracy in Singapore

Jason Tan

Introduction

Notions of equality and fairness in education continue to bedevil Singapore's education system, as is the case in most other countries. Educational attainment in Singapore has often been viewed as a key means of upward social mobility, building social cohesion as well as talent development for economic ends. Questions such as how educational opportunities are distributed, as well as the reality of unequal educational outcomes, remain controversial and politically volatile. The four chapters in Section B have made clear the twin realities of inequalities in family support for schooling and unequal educational outcomes. This chapter interrogates such issues by considering the macro-level social context within which these realities may be better understood. In the process, it references the chapters on Singapore education, namely, the chapters that follow, as well as Chap. 7 in the previous section.

Over the course of almost six decades of uninterrupted rule by the People's Action Party (PAP), the idea of 'meritocracy', i.e. individual ability, talent, hard work and effort being the sole determinant of an individual's educational and career success, has manifested itself in the education system in various forms. The education system has the key task of identifying and rewarding 'merit' while sorting out students on the basis of this 'merit'. The highly competitive nature of schooling is coupled with the key notion of education as a key means for intergenerational social mobility. At the same time, the profoundly elitist mode of political governance in Singapore has manifested itself as well in the eugenically-based beliefs of the first Prime Minister, Lee Kuan Yew. Lee believed in the preponderance of genetic endowment in determining individual intelligence. His beliefs were reflected within major policy decisions with regard to the allocation of educational opportunities.

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Another important strand in the discussion of meritocracy in Singapore involves the evolution of meritocracy. Over the past two decades, the Ministry of Education has openly welcomed the active involvement of parents. In recent years, the role of parents' financial resources as well as parental strategising has become increasingly apparent in influencing students' educational success. This can be seen in the sprouting of various parental networks on social media websites as well as the phenomenal growth of the private tutoring industry. At the same time, there is growing evidence of an over-representation of students with highly educated parents in the most prestigious secondary schools (which Teng's Chap. 9, p. 127 has noted).

This commentary highlights these changes in parenting and schooling and elaborates on the term 'parentocracy' (Brown, 1990) that is introducedd in Teng's Chap. 9. It will ask whether the growing role of parental background and resources challenges the concept of fairness embodied within the concept of meritocracy. Recent Ministry of Education policies attempting to promote greater equity are likely to come up against the reality of the 'parentocracy'. The topic of inequalities in education has in recent years risen to the forefront in public policy debate, and this chapter will serve as the basis for further informed discussion on the nature of inequalities and how their effects might be best ameliorated.

The Wider Context of Schooling in Singapore

In order better to understand the current state of equity and meritocracy in Singapore, some historical perspective is instructive. First, when the current ruling PAP took office in 1959, it inherited a collection of disparate schooling systems operating through different language media and with different examination systems and teacher qualifications (Gopinathan, 1974). Just a few years before then, the Singapore Legislative Assembly had commissioned an All-Party Committee to study Chinese-medium education (Singapore Legislative Assembly, 1956a). The British colonial government at the time responded to the Committee report by issuing a White Paper on Education in 1956. The Paper identified three major problems: dealing with racial diversity, coping with the increase in the school-age population and developing a sense of common Malayan loyalty in schools (Singapore Legislative Assembly, 1956b).

The PAP reaffirmed its commitment to equal treatment of the four language streams (State of Singapore, 1959, p. 1). Its push for building a common national education system proceeded with vigour during the early- and mid-1960s. For example, common syllabuses and attainment standards were designed for all schools. Students in the four language streams underwent the same number of years of schooling and sat for common national terminal examinations (Gopinathan, 1974). A massive school building programme began in the 1960s, with primary schooling becoming universal and free by 1966. The Ministry of Education steadily assumed control over almost all schools with the exception of a few private schools, madrasahs and international schools. In 1983 another major step towards a unified

education system occurred when the government announced that from 1987 onwards the entire education system would operate almost entirely through the medium of English.

One of the key planks in the PAP's governing ideology was a 'meritocratic' ethos in which rewards for individuals would be based on one's 'merit', i.e. educational achievement attained through individual ability, talent, hard work and effort (Gopinathan, 1991, p. 281). Individuals deemed to have exhibited sufficient 'merit' through obtaining outstanding results in the national pre-university terminal examinations were invited to apply for special high-prestige scholarships to join the ranks of the armed forces, police force and civil service. This system of 'meritocracy' was pronounced by the PAP as being fair and neutral and as being the most efficient way of harnessing talent within a small population (Lee, 1982). This policy of 'meritocracy' has since assumed the status of one of the state's founding pillars. Another key pillar was that of multiracialism, which claimed to provide equality of treatment for all citizens in an ethnically diverse newly independent nation. The state on its part pledged to ensure equal educational opportunities for every student to compete for success in a series of common national examinations at both primary and secondary levels within a unified and standardised education system. Thus, the schooling system held out the promise of intergenerational social mobility for students, provided they demonstrated sufficient individual 'merit' in these examinations.

After two decades of sustained efforts to unify and standardise schooling experiences for the entire school-age population, a new era of sorting and differentiation was ushered in with the publication in 1979 of the *Report on the Ministry of Education 1978* (widely referred to as the Goh Report, in reference to the then Education Minister Goh Keng Swee who was the chief author of the report). The Report lamented, among things, the high dropout rates at both primary and secondary levels. About 71% of the primary one enrolment each year eventually passed the Primary School Leaving Examination (PSLE), with only 9% passing the General Certificate of Education 'Advanced' Level examination (the national pre-university terminal examination) (Ministry of Education, 1979, p. 3-1). Other major problems included low literacy levels and the lack of effective bilingualism among many school leavers. A major policy reform was advocated, that of streaming students into different tracks in order to ensure that learning experiences could be better tailored to variations in students' learning abilities. Primary students would henceforth be streamed at the end of primary three, while secondary students would be streamed on the basis of their Primary School Leaving Examination results. Interestingly enough, the report noted the relationship between students' home background and their academic achievement: 'Good schools have higher percentages of pupils from better home background, in terms of pupil's father occupation and educational level than the other schools….the differences in the percentages between the good schools and the poor schools are significant' (Ibid, p. 3–5). The report claimed too that '[a]mongst the factors that have been analysed, pupils' home backgrounds and the types of school (whether government or government-aided) are the only factors that are significantly different between the good and the poor schools. Most of the good schools are government-aided schools whose pupils are

mainly from better home background' (Ibid, p. 3–6). The claims about the impact of students' home background were an admission that even after two decades of state intervention to ensure comparability of such factors as physical infrastructure and teacher training across schools, the playing field was not yet levelled for students from differing socio-economic backgrounds. However, the report did not elaborate on how students' socio-economic backgrounds influenced their educational achievement.

Since the institutionalisation of streaming at both primary and secondary levels of schooling almost four decades ago, streaming has been a heated topic of debate both in and out of Parliament. In the early 1990s, various modifications were made to the streaming system. By the first decade of this century, concerns continued being voiced about streaming being a divisive element in terms of keeping students segregated in their various streams. Attempts were made to soften and blur these harsh boundaries at both primary and secondary levels. Efforts have been made to provide students from lower-prestige academic streams with greater opportunities for upward mobility to higher-prestige academic streams. In addition, subject-based banding has now been introduced in both primary and secondary schools. Nevertheless, the concept of differentiated tracks for different students, with different tracks leading to different terminal examinations, has remained essentially unchanged.

Besides the streaming and banding of students, other Ministry of Education policies since the 1980s have introduced greater diversity of programmes and choices for students (a point mentioned in Kwek, Miller and Manzon's Chap. 7 in the previous section). In the 1980s, the Gifted Education Programme was introduced at both primary and secondary levels, along with the Music Elective Programme and Art Elective Programme in a small number of secondary schools. In the late 1980s and early 1990s, a few prestigious secondary schools were allowed to become independent schools, with the promise of greater operating autonomy, in order to promote greater flexibility and innovation within the wider education system (Tan, 1996). In the mid-1990s, some other secondary schools were granted 'autonomous school' status, in order to provide a high-quality education while charging lower fees than those in independent schools. As a result of a Ministry of Education report published in 2002 (Ministry of Education, 2002), top-end secondary schools and junior colleges began offering so-called integrated programmes that would allow students the chance to bypass the General Certificate of Education 'Ordinary' Level examination (normally taken at the end of 4 years of secondary education). At the same time, a number of specialised independent schools were established to cater for secondary- and junior college-age students with talent in the arts, sports and mathematics and science. A few specialised schools were also set up to cater for secondary-age students who had failed the PSLE at least twice, in order to provide them a chance at leaving school with vocationally appropriate qualifications.

The 1980s marked the beginning of what Tan (2010) refers to as the marketisation of education. Parents and students were increasingly being introduced to the virtues of terms such as 'diversity', 'choice' and 'competition'. Former Prime Minister Goh Chok Tong said in 1992 that

[a] good education system depends not only on resources, which the state will provide, but also on the following: students competing to do well in schools; schools competing against one another; good schools emerging to show other schools how they can improve. (Goh, 1992, p. 31)

In line with this emphasis on marketisation, league tables that ranked schools in terms of students' performance in national examinations and in terms of value-addedness were introduced for all secondary schools and junior colleges. Furthermore, the School Excellence Model, which was based on business world practice, was introduced as a means of quality assurance for all schools. In the wake of the introduction of these performance measures, evidence began emerging of some schools resorting to strategising (e.g. reducing enrolments in, or eliminating altogether, subjects that were supposedly difficult for students to do well in; phasing out co-curricular activities that failed to bring in sufficient medals in interschool competitions) in order to boost their tangible achievement outcomes (Tan, 2010). A further manifestation of the commodification of education was the introduction of terms from the world of business such as 'pleasing the customer', in Ministry of Education discourse in the late 1990s.

Even as the process of diversification co-existed with the marketisation of the educational landscape, the Education Ministry introduced the annual Direct School Admission (DSA) scheme for secondary schools in 2004 and for junior colleges in 2005. The scheme allows schools full discretion to conduct selection interviews and devise their individual selection criteria to offer admission to a certain percentage of their annual student intakes before students sit for the qualifying national examinations. The DSA scheme marked the broadening of the term 'merit' to encompass not only academic performance in national examinations but also non-academic endeavours.

The substantial changes in the educational landscape have not been without their share of critics, who allege, among other things, that they promote elitism. In reply to criticism that so-called neighbourhood schools (generally less prestigious schools) were inferior to independent schools, the then Education Minister claimed that

it is a misconception that neighbourhood schools do not have good principals and teachers. In fact, very often so-called good schools do well because the children are very bright. They have tuition at home and all the support. And often it is the teachers in the neighbourhood schools who have to work harder, provide remedial lessons…to give the children that additional advantage. (Parliamentary Debates, 63, August 25, 1994, Col. 398)

There was an implicit official recognition (similar to that in the Goh Report of 1979) that students' socio-economic backgrounds play a part in academic achievement. Over the years, this connection has persisted till the present. For instance, Tan (1993) found an over-representation of students with university-educated parents and more prestigious housing types in a few independent schools. Similarly, the National University of Singapore sociologist Chua Beng Huat pointed out that students from public housing were under-represented and those from private housing were over-represented in independent schools (George, 1992). In 2011, former

Prime Minister Lee Kuan Yew presented statistical evidence that a far greater percentage of students in more prestigious secondary schools than their counterparts in less prestigious secondary schools had university-educated fathers (Chang, 2011). A few years prior to his revelation, Lee had informed Parliament that

> We are trying to reach a position where there is a level playing field for everybody which is going to take decades, if not centuries, and we may never get there. (Parliamentary Debates, 86, August 19, 2009, Col. 1173)

Although Lee was speaking with reference to the ethnic Malay minority in Singapore, his remarks acknowledged that decades of an ostensibly meritocratic system had co-existed with a less-than-level playing field for at least part of the populace. Lee had also claimed in 1992 that

> [i]f you pretend that…in fact (the Malays) can score as well as the Chinese in Mathematics, then you have created yourself an enormous myth which you will be stuck with. And there will such [sic] great disillusionment. (Richardson, 1992)

Lee's remarks are consistent with his well-entrenched elitist views about the predominance of genetic endowment in determining individual intelligence (Barr, 2000). These views have played a significant role in the elitist nature of political governance in Singapore (Quah, 2010). Since coming to power, Lee placed great urgency on the quest to identify talent through the education system. In 1966, he told school principals that the education system ought to produce a 'pyramidal structure' consisting of three strata: 'top leaders', 'good executives' and a 'well-disciplined and highly civic-conscious broad mass'. The 'top leaders' are the 'elite' who are needed to 'lead and give the people the inspiration and the drive to make [society] succeed'. The 'middle strata' of 'good executives' are to 'help the elite carry out [their] ideas, thinking and planning', while the 'broad mass' is to be 'imbued not only with self but also social discipline, so that they can respect their community and do not spit all over the place' (Lee, 1966, pp. 10, 12, 13). The implementation of streaming and a stratified hierarchy of schools and academic programmes in primary and secondary schools may be viewed as a direct attempt to use the school system to create Lee's 'pyramidal structure' and to identify and nurture the future elite (Barr, 2014; Barr & Skrbis, 2008).

The logical intergenerational consequence of a stratified education system preparing students for unequal futures in the workforce has been the persistence of wider societal inequalities. The current Prime Minister Lee Hsien Loong has observed that Singapore society is 'stratifying' and that 'while the children of successful people are doing better, the children of less successful people are doing less well' (Cai & Heng, 2011). Voicing similar concerns, National University of Singapore professor Irene Ng (2015, p. 39) feels that '[i]ntergenerational mobility is at most moderate in Singapore, but will be increasingly challenging given Singapore's education system which has several characteristics that tend to reinforce intergenerational immobility'.

On its part, over the past few decades, the government has instituted a number of policy initiatives in a bid to level the playing field in education. A major instance of this is its financial support for ethnic-based self-help groups such as the Council for

the Development of Singapore Malay/Muslim Community (Yayasan Mendaki), Singapore Indian Development Association (SINDA) and the CDAC Chinese Development Assistance Council (CDAC). Among the major prongs of these organisations is the provision of low-cost tutoring in order to boost academic achievement. Another prong is the running of parental workshops in order to better educate parents on how to provide a home environment that is supportive of academic achievement. A second major example is the Education Endowment Scheme (more commonly known as Edusave), which was instituted in 1993. The scheme provides every child between the ages of 6 and 16 in mainstream schools, special education schools and madrasahs with a common annual financial subsidy from the government. The money is to be used for educational purposes. In addition, every school is awarded annual per capita Edusave grants. Furthermore, students who perform well qualify for Edusave scholarships and merit bursaries, achievement, good leadership and service awards, character awards and good progress awards (see Tan & Gopinathan, 1999; Ministry of Education, 2014). The Education Ministry, besides its long-standing financial assistance schemes for students, and its Learning Support Programme for literacy and numeracy in the first 2 years of primary schooling, has also instituted student care centres in primary schools, with a special focus on targeting students from disadvantaged families who have inadequate parental supervision at home (Ministry of Education, 2009). Lim (2012, p. 44) has highlighted these student care centres as an example of the PAP's attempts to 'recover the egalitarian strand in the government's meritocratic ideology'. Another key focus in recent years is the attention on improving preschool education and special needs education (see, for instance, Hong, 2018). Poon has discussed in his Chap. 10 in this section the subsidies and assistance, such as the Focused Language Assistance in Reading (FLAiR) rendered to preschool children from families with lower income levels.

The Relationship Between Parenting and Schooling

Another trend that has affected the notion of meritocracy in Singapore has been the increase in parental involvement in schooling. The international literature is full of evidence on the value of positive parental input in their children's schooling. For instance, Goodall and Montgomery (2014) proposed a continuum ranging from parents' involvement with schools at one end to parental engagement with children's learning, at the other. 'Parental involvement with the school' describes situations where school staff predominate in the partnerships with parents. Parents may be involved in activities but are passive recipients of school-initiated and controlled activities. The school controls the relationships and the information flow. Examples of this include parents being invited to tour the school or school-initiated parent-teacher meeting nights. Further along the continuum, 'parental involvement with schooling' describes an interchange of information between parents and schooling that can take place either in school or in the home. There is shared parents-school agency in relation to supporting children's learning. An example of this may be

parental assistance in the home with school-assigned homework. At the other end of the continuum is 'parental engagement with children's learning'. This phase involves the greatest exercise of parental agency, in which parents exercise great influence over the choice of action and involvement. Examples of this kind of agency (which are mentioned in Teng's Chap. 9) include parents providing learning opportunities for their children (e.g. extra tutoring) or other forms of learning (such as dance or music lessons). Parental aspirations and interest in learning are key characteristics of this end of the continuum.

A major watershed event in parent-school relationships was the inauguration in December 1998 of Community and Parents in Support of Schools (COMPASS) as an advisory body tasked with strengthening and promoting school-home-community collaboration. The COMPASS members include Education Ministry officials, representatives from various school-based parent support groups, the ethnic-based self-help groups and members of the business community and media (Ministry of Education, 2015). The council is co-chaired by two senior members of the ruling PAP. According to its website, COMPASS aims to

Provide feedback on MOE [Ministry of Education] policies and initiatives from parental perspectives; actively reach out and encourage parents to partner schools to deliver student-centric values-driven education; and promote school-home partnerships to achieve student centric values-driven education by leading and organising parent outreach events, forums and discussions. (Ministry of Education, 2015)

The COMPASS website further claims that parents and grandparents are to

Support schools in their efforts to educate the child; take ultimate responsibility for the upbringing of their children/grandchildren and set good examples for them to follow; instil a sense of responsibility in their children/grandchildren, helping them to become good citizens; show care and concern for their children/grandchildren by being interested in what they do. (Ibid)

After the formation of COMPASS, the presence of parent support groups in schools became universal. Another big step in the direction of encouraging parental involvement in schools was the institution of parental volunteering as a criterion within the annual nationwide primary school admission exercise.

Other factors have been at work leading to increasing parental involvement with their children's schooling experiences. One of them has been rising family incomes. For instance, the 2010 Population Census revealed an average annual 3.2% increase in household incomes from work. In addition, the proportion of households earning at least $6000 per month increased from 27% in 2000 to 43% in 2010. Furthermore, the proportion of dual-income married couples rose from 41% in 2000 to 47% in 2010 (Wong, 2011, pp. 9, 11, 13). A possible contributory factor to rising incomes has been improving levels of educational attainment in the general population. Half of the resident population above the age of 25 had at least post-secondary qualifications in 2013 compared with 32% in 2003. The corresponding figures for university graduates for the 2 years were 27% and 16%, respectively, while those for diploma and professional qualifications were 14% and 9.3%, respectively (Wong, 2014a, p. 9).

Rising family incomes and parental educational levels have contributed to rising parental aspirations on the part of a growing segment of parents of school-age children. These aspirations are being fuelled in part by continuing empirical evidence on the relationship between educational attainment and salaries. Yeo, Toh, Thangavelu and Wong (2007) found that in 2004, a worker's earnings were increased by 13.7% per extra year of schooling, with higher rates of return for tertiary education. Similarly, Low, Ouliaris, Robinson, and Wong (2004) found a relatively high premium on higher education, along with evidence that the wages of more highly educated workers increased faster than those of their less educated counterparts, as work experience increased.

Khong (2004) claims that 'the involvement of parents in schooling is a relatively new phenomenon' and cites earlier academic research from the mid-1990s showing parents' preference for assigning teachers the bulk of the responsibility for their children's schooling. However,

> the highly-competitive system and a cultural acceptance of education as the key social 'equaliser' has created a complex situation where parents today generally have high expectations of children's academic achievement and are willing to invest heavily in maximising children's educational opportunities. (Khong, 2000)

These parents' proactive attitudes have, if anything, official support from the Ministry of Education's COMPASS advisory body. On a more positive note, the former Prime Minister Goh Chok Tong has recently highlighted 'a warm, supportive family' and a 'conducive, stable and secure environment' as key factors underpinning students' academic success (Goh, 2015). However, in a more strongly worded statement, the former Minister for Social and Family Development Chan Chun Sing has acknowledged that intense competition and the aspiration 'for our children to achieve is even more intense than ever' (Tai, 2014).

Anecdotal evidence suggests a rise in proactive parenting. The advent of social media has led to the emergence of sites for parents to widen their social networks in order to find out more information and strategise their children's educational success. There are now numerous parental online networks that provide a host of information ranging from informal school rankings (even after the Ministry of Education officially discontinued the practice) to tips for selecting private tutors, comments on the effectiveness of teachers in various schools, the relative difficulty of examination questions and information on how to succeed in school admission exercises. Anecdotal evidence would also appear to indicate a growing 'complaint culture', in which a growing number of parents exercise their right as 'customers' to provide input about 'unsatisfactory customer service' from their children's schools, whether it be inappropriate amounts of homework, incompetent teaching, the quality of food in the school canteen, the need for extra lessons after school hours or the choice of destinations for overseas study trips. These complaints have moved beyond their traditional sites in the mainstream press to encompass emails to school authorities or to the Education Ministry, as well as on social media sites.

Other forms of parental strategising include the annual rush to enrol as parent volunteers in more prestigious primary schools or as volunteers in the People's

Association, a government-funded grassroots organisation, in order to secure priority during the primary school admission exercise (Lee, 2014b). Some schools have scrapped the parent volunteer priority scheme, claiming that they are overwhelmed each year by parental requests to become volunteers (Lee, 2014a).

Yet another form of parental strategising can be seen in the growth and evolution of the private tutoring industry (mentioned in Teng's Chap. 9, p. 139–140) in direct response to Education Ministry policy changes. This industry, which was estimated in a recent press article to be worth more than S$1,000,000,000 annually (Tan, 2014), has moved beyond the provision of academic tutoring in school subjects to providing parents with tutoring (so as to enhance their ability to help their children with their homework) (Heng, 2015). Tutoring has also evolved to the stage where some tutors promise parents to help with securing their children admission during secondary schools' DSA exercises. Not only are tutors now offering sports tutoring (Wong, 2014b), they are also helping students prepare for tests, auditions and interviews (Teng, 2014).

The rise of such proactive parental behaviour may be due to the fact that not all parents are convinced by the Education Ministry's recent 'every school is a good school' rhetoric (Heng, 2012) or by the ruling party's claim that university degrees do not represent the only way to success (Yong, 2014). Well-entrenched perceptions of different streams in primary and secondary schools leading to unequal educational outcomes (especially when these outcomes have implications for access to higher education, career opportunities and differing income levels) will prove difficult to uproot. The fact that these parents perceive (correctly or otherwise) different schools to have different rates of success in national examinations, as well as conceptions about the prestige of various options in the diversified education landscape, fuels the annual scramble to have their children enrolled in more prestigious schools or streams (a phenomenon that has been acknowledged by Goh Chok Tong and Lee Hsien Loong in their National Day Rally speeches of 1996 and 2013, respectively) (National Archives of Singapore, 2017). The admittedly generous amount of government subsidies for vocational education (Law, 2015) has not resulted in vocational education moving up the prestige hierarchy for many students and parents. Ironically, greater diversity of the educational landscape may have accentuated the need to keep abreast of the various options available, especially at the post-primary level. It has also highlighted the importance of social networks of information as well as private tutoring in order that children perform well not only academically but also in the DSA exercise.

Implications

This commentary has outlined key ways in which the Singapore education landscape has evolved over the past five decades. Two decades of standardisation have given way since the 1980s to increasing diversity and choice along with a growing marketisation and commodification of education. The school system has also

maintained its elitist nature even as it claims to provide equal opportunities for all students. At the same time, the Ministry of Education has openly institutionalised the importance of parent-school partnerships in the form of the COMPASS advisory council. More and more parents are adopting what Goodall and Montgomery term 'parental engagement with children's learning' instead of mere 'parental involvement with the school'. This is manifested, for example, in a growing reliance on private tutoring not only to secure success in academic results but also in admission to preferred secondary schools. Parents are also more vocal about their rights as 'customers' and are more engaged in networking so as to find out more about the changes in educational policies and the implications of these changes for their strategising for their children's educational success.

In many ways, Singapore appears to be exhibiting what Brown (1990) has termed 'parentocracy'. In his paper, Brown discussed what he felt was a shift from the first wave, where educational provision was governed by the 'feudal dogma of social predestination', to the second wave, the 'ideology of meritocracy' (where the provision of education was organised on the basis of individual merit and achievement), and then onto the third wave, that of 'parentocracy' (where the education a student receives conforms to the wealth and wishes of parents rather than the student's individual ability and effort). Fifty years after political independence, it would appear that Singapore too is showing signs of the emergence of 'parentocracy'. This 'parentocracy' has yet to totally displace meritocracy (Teng's Chap. 9 indicates that some parents still have faith in the promises of the meritocratic education system). Rather, it appears that the two ideologies appear to be co-existing rather uneasily. In other words, the ideals espoused in one of the Singapore state's founding pillars, 'meritocracy', would appear to be somewhat under threat from the emergence of 'parentocracy'. There are no empirical data to determine the exact balance between the two ideologies. However, it is obvious that there has been a persistent link over the past few decades between students' socio-economic background and their academic achievement. It is also evident that more parents are no longer content to let the schools do all the work of educating their children. The growing reliance on private tutoring appears to indicate parental anxiety about whether their children will succeed academically without additional out-of-school assistance. In a sense, too, the state's endorsement of tutoring run by ethnic-based self-help groups, as well as by various community centres, would seem to lend credence to this point of view.

What are the implications of the trends that have been outlined in this commentary? Firstly, not all parents are equally placed to take advantage of opportunities for 'parental involvement with the school', much less 'parental engagement with learning'. Despite the existence of various state policy initiatives such as Edusave and the Education Ministry's Financial Assistance Scheme, as well as efforts by ethnic-based self-help groups, it is increasingly clear that the playing field is far from level for all students. Parents with different levels of financial, social and cultural capital are differentially placed in terms of helping their children with educational success. These parent-based inequalities have been highlighted in Chaps. 10, 11 and 12 of this volume. For instance, the diversity of educational options mentioned in Chap. 7 has increased the need for all parents to be equally

well-informed of these options and the related implications for their children's educational success in order that they are able to make informed decisions. Besides, less-privileged parents will still lack access to the financial and social capital that are necessary in order to make the same sorts of strategic decisions and moves that better-off parents are currently engaging in. This is especially true of the migrant mothers highlighted in Chap. 10, whose lack of financial, social and cultural capital is compounded by their relative social isolation as new immigrants. The kind of community support mentioned in the chapter needs to be expanded to include not just private tutoring but, more importantly, knowledge of the educational landscape and help with navigating it. Similarly, such support would also be crucial to help facilitate the sort of collaborative efforts between the school and family environments to support young children with special needs from low-income backgrounds that Poon discusses in his Chap. 10.

A second implication is that the unequal educational outcomes that have been engendered over almost four decades of streaming at both primary and secondary levels may have implications for intergenerational mobility. Those parents who were streamed into lower-prestige tracks as students find themselves unequally placed, vis-à-vis their counterparts who were streamed into higher-prestige tracks as students, to play more proactive roles in assisting their children with their educational success. It is perhaps only natural that the latter group of parents would want to preserve and reproduce their social privilege in their children as well. This particular possibility is worrying at a time when even the ruling PAP has acknowledged the possible effect of social and educational inequalities on intergenerational mobility and wider social cohesion.

The commentary has raised a number of questions for educators and policymakers. Even as Singapore students enjoy superior outcomes in international comparative tests of educational achievement, making the Singapore school system the envy of many others in the world, there are real issues of equity to be grappled with. The existence of intervention programmes such as those mentioned in Chaps. 11 and 12 suggests that the task of levelling the playing field for all students will prove arduous for the foreseeable future. The Singapore government has acknowledged that schools are a key arena for addressing the issue of wider social inequalities (Hong, 2018). However, its efforts over the past few decades to provide greater educational opportunities for students from disadvantaged socio-economic backgrounds have yet to result in a sustained reduction in educational inequalities. For one thing, there are long-standing issues of weak parental involvement and relatively modest parental aspirations, along with low English language proficiency, and a lack of competitive strategising for students' educational success within the context of an emerging parentocracy. Existing official programmes offering financial assistance and supplementary learning programmes only offer partial remedies. Teo (2018) argues that a few key features of the education system, such as the difficulty of the curriculum, early sorting and labelling of students and the high-stakes nature of national examinations, have fuelled the growth of parental involvement and an increasing reliance on private tutoring services. Consequently, students from lower socio-economic backgrounds find it progressively difficult to compete on an equal

footing with the more privileged peers, thus undermining the ideal of meritocracy. At the same time, Teo calls for greater attention to be paid to the ways in which low-wage work has direct implications for the quality of child care in low-income families. Since it is practically impossible to curb privileged parents' aspirations or their attempts at educational strategising, the only long-term solution to the problem of increasing educational equity appears to be Herculean: official or community efforts to overcome the handicaps associated with low socio-economic status and social marginalisation, coupled with Ministry of Education attempts to address structural, curricular and assessment issues that exacerbate educational inequalities.

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Chapter 9
Diversity and Equity in Singapore Education: Parental Involvement in Low-Income Families with Migrant Mothers

Siao See Teng

Introduction

With its prominence as one of the top-performing systems on international tests such as the Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS), Singapore's education system is often regarded as a reputed one in the international arena. This is often seen as a result of much investment in education both at the individual family and the societal level. Having transformed from an underdeveloped country to a largely middle-class developed society within a few decades, education is seen as holding the meritocratic key to a better life. With increased literacy, wealth and fewer children in families over the 50 years of Singapore's independence, parents focus on more spending and efforts on supporting their children. However, in recent years, there has been a rising concern that the meritocratic promise the Singapore's education system holds is diminishing (Koh, 2014). Growing income disparity in Singapore has led to concerns about an emerging "parentocracy" (Ong, 2014). Children from better-off families are seen as having competitive advantages through their parents' ability to provide better resources such as quality private supplementary education and/or even old school connections to enable their enrolment in prestigious schools. In 2011, the late Minister Mentor, Lee Kuan Yew, shared statistics indicating that about 50% or more of students from brand-name schools had fathers who were university graduates. About only 10% of the students from neighbourhood schools have graduate fathers (Davie & Chew, 2012). Prime Minister Lee Hsien Loong had also expressed concern over stratification in Singapore:

> *Our society is stratifying, which means the children of successful people are doing better, the children of less successful people are doing less well. Fewer children from lower-income families are rising to the top of the heap.* (Lee, 2011)

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In addressing such concerns, the Ministry of Education had over the years introduced various initiatives such as financial assistance and support programmes for the more vulnerable students.[1] While these measures are certainly a positive move in levelling up more vulnerable students, it is unclear to what extent they mitigate the negative effects of parentocracy on the have-nots. With the greater globalisation and demographic trends in recent years, the profile of students and make-up of low-income families in Singapore have also become more diversified.

In fact, currently there is on the whole little documentation and research into the family profile of and parental involvement in education among low-income families in Singapore. Without such data, it is difficult to gauge how more vulnerable families are faring. This chapter thus aims to contribute to the knowledge on the profile and parents' educational support of low-income families, taking into account the impact of demographic change through a study on migrant mothers' involvement in their Singapore citizen children's education. It attempts to throw some light on who these families are, the kind of parents' educational support offered to these students and the challenges faced in rendering that support. As scholars noted, it is most important to have a good understanding of the family culture and practices, how such families transmit knowledge and the ways learning are valued, in order to build family and school relationships as well as benefit teaching in class for these students (Weiss, Bouffard, Bridglall, & Gordon, 2009).

Parentocracy and Parental Involvement

The term, "parentocracy", introduced by Philip Brown (1990), refers to the third sociohistorical phase of education in Great Britain which succeeded a first phase of selection premised on birth and a second meritocratic phase where educational selection was premised on ability. This third phase, parentocracy, which with the rise of the middle class, saw educational selection increasingly based not on the individual's merit but parents' ability to invest in their child's education. For academics like DeWiele and Edgerton (2016), parentocracy also entailed a shift in the social construction of parental involvement with the universalising of the middle-class discourse of parental involvement as the norm. The more active engagement and interventionist approach of the middle-class parents became seen as the form of parental involvement universally applicable to all parents. As Smith (2006) puts it:

> *The most widely accepted definition of parental involvement focuses on behaviors that can more easily be accomplished by middle- and upper-income parents* (Mapp, 2003)*. The*

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[1] These include more financial assistance for students from low-income families such as the MOE Financial Assistance Scheme, Edusave Merit Bursaries and Opportunity Fund, and the Learning Support Programme (LSP) for English and the Learning Support for Mathematics (LSM) to assist low-progress students. More subsidies have also been introduced for preschool education to support students from low-income families.

current parental involvement policies, built on the accepted definition, disregard the needs of low-income children and their families… (Smith, 2006, p. 45)

The demerits of accepting middle- and upper-class values as the norm mean not only overlooking and ignoring the possible empowering strategies for low-incomes families but also dismissing the efforts of low-income families and narrowly construing parents' involvement as predominantly the purview of individual families and not the shared responsibility of different education stakeholders.

Parental Involvement and Low-Income Families

Parental involvement in education had been referred to as "participation in any activities that support children's education, whether those activities occur at home, in school, or in the community" (Weiss, Mayer, & Kreider, 2003, p. 882). In international literature, much has been written on the impact of family background on educational experiences and achievements. Some studies have shown that parental involvement in education is related to children's educational performance (e.g. Barnard, 2004; Fan & Chen, 2001; Feuerstein, 2000). Socio-economic status (SES) strongly shapes the kind of resources parents can transmit to their offspring as well as the kind of support parents could offer to their children's education. Parents of lower socio-economic status often face monetary, resources and time constraints. Thus, children from low-income families are also often perceived as students at risk of academic low achievement as their parents are less likely able to provide as much resources for them as parents of other SES. Many low-income parents rarely have jobs that offer paid leave and flexible work arrangements (Heymann & Earle, 2000); thus educational involvement and support from the parents have to be navigated around these challenges.

Apart from monetary and time constraints, low SES parents also tend to possess less of the social and cultural capitals schools tend to value, which parents from higher SES families can easily tap onto as important educational resources for their children (Bourdieu, 1986; Lareau, 1989). Middle-class parents could transmit what Lareau calls "home advantage" to their children in the form of translating valuable Bourdieu's social capital (social networks) as well as cultural capital (knowledge and skills) into valuable educational support for their children (Horvat, Weillinger, & Lareau, 2003). The habitus (habits, dispositions) of parents of higher SES also better facilitates the transmission of these capitals. For the lower SES families, on the other hand, there is usually greater discrepancy and discontinuity between the cultural and social capital the families possess and that required by schools (Moll, Amanti, Neff, & Gonzalez, 1992). This in turn shapes the kind of educational involvement parents of different SES extend to their children.

With greater challenges to overcome in their support to their children's education, parents from low-income families are often characterised as minimally involved in their children's education (Jackson & Remillard, 2005). Explanations of the

educational support from low SES families are also often formulated around a deficit thesis that depicts such parents as deficient in the economic, social and cultural capital to support their child in education or care less about their children's education. Researchers deconstructing the deficit thesis take issue with pinning the blame on the parents' "lack" and argue that school personnel often take middle-class parental involvement as *the* standard of parents' educational involvement from which the lower SES parents' educational involvement deviates, devaluing the cultural capital of lower SES parents:

> *Because parent involvement is most often evaluated from the school's vantage point, parents whose activities do not look like traditionally accepted behaviors associated with parent involvement or are not visible in the school are often classified in the literature as being minimally involved. Most often, low-income parents are classified that in this way (Lawson, 2003; see also Lareau, 2000; Lightfoot, 2004).* (Ibid, p. 54)

Studies on disadvantaged/minority families have shown that parents from low-income families can be as interested and as involved in their children's education within the constraints they have. Low-income parents as a whole do take interest in their children's learning and some even contribute to helping their children in their studies (Weiss et al., 2003). There is evidence in the United States, for instance, of low-income African/Latino families who are positively involved in their children's education even if their efforts and nature of support may differ from what is usually recognised in mainstream culture. Mothers from low-income families have also voiced out their aspirations for their children, monitored their children's progress in school, assisted them in schoolwork, strategised ways to help with Mathematics coaching and provided learning opportunities outside of school (such as obtaining educational materials to aid the children and create informal learning opportunities). These forms of parental involvement could be described as "involvement in children's learning" and "involvement in children's schooling" which are distinct from the type identified as "involvement in children's school" (Jackson & Remillard 2005, pp. 54–55). Involvement in school requires greater alignment of cultural capital at home and in school, an area in which low-income families are disadvantaged.

Thus some scholars argued for the overcoming of the deficit thesis by avoiding narrow definitions of parental involvement and focusing attention on the efforts made by low-income parents/families (Jackson & Remillard, 2005; Smith, 2006; Weiss et al., 2003). A number of academics also drew attention to the notion of parents' educational involvement as a social construction that is shaped by the collaboration among parents, schools and communities, beyond mere individual families (DeWiele & Edgerton, 2016; Hoover-Dempsey, Whitaker, & Ice, 2010). They are of the view that the imparting of cultural capital can be shouldered by different stakeholders and not merely the responsibility of the individual family.

Changing Demographics and Diversified Disadvantaged Student Profile in East Asia

The variance in low SES families has, in a way, been documented in international literature. Scholars believe that race, class and immigration are three dimensions of equity that have most impact on constructing relations among educational stakeholders and parents from non-dominant groups (Baquedano-Lopez, Alexander, & Hernandez, 2013; Herrera & Noguera, 2013). Studies in the United States, for example, have looked at the Latino and African migrant families, exploring how the intersections of race, class and migrant status contribute to further challenges for the vulnerable low-income families as they fall into more than one category of the less privileged. For instance, education assistance programmes may not work well for all low-income families, the marginalisation of Latino families due to the "Anglo-conformity" (the phenomenon of catering to all based on Anglo-white experiences without factoring in diversity issues) of programmes such as family literacy interventions in the United States (Baquedano-Lopez et al., 2013, p. 161). These families face the issues of unfamiliarity with the US school system as well as the medium of instruction.

In recent years in Asia, particularly the better-developed societies such as Singapore, South Korea and Taiwan, globalisation and migration trends had introduced certain distinct demographical changes with a rising number of low-income families built from international marriages. More men in these societies are marrying foreign women from less developed Asian societies, producing new local-born citizens with foreign-born mothers.

In the case of Singapore, about 30% of citizen births had a non-Singapore Citizen parent in 2008, and 70% of these births were attributed to the union between Singapore citizen fathers and their foreign (largely Asian) spouses (National Population Secretariat, 2009). This translates into about a fifth of citizen births, a substantial number. While there is yet much research and publicity to be done on these children in Singapore, some insights can be gained from a quick reference to other more developed East Asian societies like South Korea and Taiwan, where children of international marriages between local men and foreign women have become a significant population prompting the authorities to seriously embark on multicultural education policies to embrace and manage diversity.

Implications of demographic changes for education had surfaced in South Korea and Taiwan in the form of academic underperformance, identity crisis, prejudice against and bullying of children from "multiracial families" in Korean schools and a weak grasp of the local working language for some "new Taiwanese" students (Hong, 2010; Hsin, 2011; Mo & Lai, 2004). These phenomena point to broader issues of equity and social integration for these societies. To address these challenges, South Korea and Taiwan have introduced measures including support for university research on these families and establishing language courses for migrant mothers to help them integrate and support their children's studies.

In the case of Singapore, these families have only emerged in public discourse occasionally in terms of media attention on the domestic abuse and residency access of migrant brides. Little is known about the development of their children. But from existing literature such as those from the above-mentioned East Asian societies, these international families are likely not to possess the social and cultural capitals such as a good command of the working language to navigate educational terrains. It is not clear, however, if the more multicultural social environment of Singapore provides some ease especially for those mothers who have a command of at least one Singapore official language. In fact, as a whole, parents' educational involvement in Singapore is still an evolving research area (e.g. Khong, 2004; Li & Hu, 2011; Manzon, Miller, Hong, & Khong, 2015) that awaits further development. The book, *Family Matters: The Role of Parents in Singapore Education* (Khong, 2004), a seminal work on parents' educational involvement in Singapore, provided important insights into the imparting and activation of social and cultural capitals across families of different backgrounds. Vulnerable international families, perhaps only an emergent phenomenon later, were not a focus then. The book *This Is What Inequality Looks Like* (Teo, 2018) offers some recent pertinent insights into the resources and limitations low-income families work with although it does not particularly focus on parental involvement in education. In general, there is more emphasis on school and classroom pedagogies and interventions to aid students at risk in Singapore rather than studies that relate to home practices and other influences outside the school in spite of the reality that the home is the earlier influential site shaping the development of school children (Wang et al., 2014).

While this chapter focuses on vulnerable families with migrant mothers, it sheds light on low-income families in Singapore about which there is little empirical knowledge, taking into consideration the impact of diversification of low-income families. Understanding more about the profile of students from low-income families and the kind of family support they receive at home could contribute to the identification of more focused and effective initiatives to assist them and to share relevant best practices. Family involvement where attempts are linked between home and school throws up some insights on how the various forms of capital impact on students and/or where interventions could be introduced.

The Research Project

An exploratory study funded by the Office of Education Research, National Institute of Singapore, was conducted in Singapore to throw more light on low-income families with migrant mothers and Singapore citizen primary school-going children. While it is not a large-scale study and thus cannot claim representativeness, it is hoped that through their stories, more leads are uncovered for further investigation and policy considerations.

Contact was first made with non-profit organisations (NPOs) known to be assisting low-income Singaporean families with migrant mothers. Through these

NPOs, researchers were acquainted with respondents utilising these NPOs' services be it assistance with family, educational, financial, housing or employment matters. Thus, respondents for this project are those who required and who also received some form of assistance. While receiving assistance may indicate a degree of vulnerability for these families, they may not be the most vulnerable ones as they are aware of help available and have taken the initiative to receive it.

Respondents' initial meetings with researchers were carried out at the safe space of the NPOs. With the consent of respondents, focus groups and interviews were carried out from 2011 to 2014 to understand their family situation and family educational support for their children. At least two face-to-face semi-structured interviews were carried out with each mother. The mothers were asked to talk about their aspirations for their children, the educational support and resources they provided to their children on a daily basis, their children's schooling situations and other activities arranged for their children outside of school, how they saw themselves supporting their children and the challenges they face in doing that.

These data collection methods were substantiated by visits to and observations of the homes of some of these mothers as well as accompaniment of mothers to parent-teacher meetings. Families with at least one child in primary school were chosen as parents' involvement at this stage is more pertinent. Findings from the interview transcripts and observation notes were triangulated and analysed with reference to the types of parental involvement. The respondents' names have been anonymised and replaced with pseudonyms in this chapter.

For the families involved in the study, there was a mix of single-parent and dual-parent families. The migrant mothers came from different Asian countries such as Indonesia, Vietnam and China. The single mothers all earned an income below $1000, while the dual-parent families had a household income of between $1000 and $2400 based on the figures reported by the mothers. All the families were receiving some form of government financial assistance. Most of the husbands were primary school leavers who worked in manual occupations. The mothers were the primary parent attending to the educational needs of their children in spite possessing little relevant cultural and social capital as well as little knowledge of local education. For most of them, the in-laws do not feature much in day-to-day activities; in other words, the families do not receive much daily help from the extended families.

Parental Involvement

Different researchers take parental involvement to refer to different things. According to Desforges and Abouchaar (2003, p. 12), "parental involvement is a catch-all term for many different activities including 'at home' good parenting, helping with homework, talking to teachers, attending school functions, through to taking part in school governance". In existing literature, parental educational involvement can be largely divided into two types: involvement in the school and

out-of-school involvement (Epstein, 2002; Mapp, 2003; West, Noden, Edge, & David, 1998).

Attendance of school events, volunteering in school activities, participation in school committees and communication with teachers/school are key forms of parental involvement in school. Parent-school communication could be further divided into three components: formal communication, informal communication and written communication. Parental out-of-school involvement in children's education usually includes direct assistance with homework, monitoring of homework, provision of educational resources and the outsourcing of help as well as the provision of a conducive learning environment and the engagement of other learning activities in and out of the home. The findings will be presented by the type of involvement in this section.

Parental Involvement in the School

As a whole, this study revealed that the mothers' educational involvement in the school was less extensive than their out-of-school involvement. There were a few mothers who reported that they hardly went into the schools of their children, as parents were allowed only to drop off and pick up their children at the school gate. These mothers took it in their stride that this was how schools in Singapore operate. None had joined a parent support group or are on chat groups with parents of their children's classmates. Any communication with other parents of students from the same school usually occurred during conversations at the school gate while waiting to pick up their children from school. This appears to concur with the literature suggesting that low-income parents engaged less in collective action in their educational involvement than middle-class parents (DeWiele & Edgerton, 2016). Apart from parent-teacher meeting (PTM), a couple of mothers had mentioned attending parenting or other workshops organised by the school.

School-Family Communication

Parent-Teacher Meetings

Parent-teacher meetings (PTMs) are an opportunity when parents get allocated time to meet up with teachers to discuss the academic progress of their children. They are organised by the school once or twice a year at the end of the school term. Most of the mothers had attended PTMs before although not regularly due to work or other reasons. Min, a Vietnamese mother, so valued parent-teacher communication that she prioritised parent-teacher meeting over work and was adamant on taking leave from work to attend it in order to learn about her son's academic performance in school. She was quite pleased with teachers' communication (in writing or over the

phone) and thought her son's school had fared well in school-parent communication. There was, however, a mother who almost missed her child's PTM as the child did not bring home the school letter and had forgotten to inform her mother about the event. This mother only found about the meeting by accident when she spoke to another mother while waiting for her daughter at the school gate.

Parents' attendance of PTM did not necessarily mean effective school-parent communication. Researchers observed some information displayed over PowerPoint slides for parents in classrooms, while they waited for their turn to talk to teachers during PTM. Probably what would have been common sense for middle-class citizen parents to take note was not the case for some of the parents in the study. With little prior knowledge and experiences of local schools, a few parents were unaware that information was being disseminated to them in school during parent-teacher meeting sessions. For instance, there were a couple of mothers who did not realise important updates on the examination format for a subject was shared on a projected screen in the classrooms where their PTM session was held.

When the researchers asked the teachers at the PTM about the availability of support offered to parents who may not be able to read and understand school letters in English, they were told that the children could pass on the messages. Children, however, may not be the most reliable messengers as evident from the mother who almost missed the PTM as she had neither heard her daughter mentioning it nor seen an official letter informing her of the event. When questioned, her then primary three daughter claimed she did not know about the event and had forgotten where she placed the letter.

Also, the mothers observed at PTM were very deferent to the teachers and were quiet most of the time. They only quietly asked whether the grades their children achieved meant that their academic performance was satisfactory. One of the mothers after the PTM revealed to the researcher that she disagreed with a comment the teacher made about her child. When questioned why she did not bring it up then, the mother replied that expressing disagreement with the teacher would be disrespectful. This aligned with existing literature which indicates that minority parents from lower SES groups tended to show deference to teachers who they regard as the authority in school.

Parent-Teacher Communication Outside of Formally Scheduled Arrangements

While most mothers would not take the initiative to contact teachers outside of the formally scheduled parent-teacher meetings, there were a few mothers who had communicated with their children's teachers more than a couple of times outside of scheduled meetings either due to their concern over their children's academic performance or well-being. Agnes had praised the teachers in her daughter's school for being understanding and helpful. Estranged from her husband but forced to continue living with him and his mistress, Agnes was very worried over the impact of her marriage breakdown on her child particularly when her grades suffered

initially. According to Agnes, the former teacher of her child understood the difficult circumstances at home and would keep her informed of her progress in school. Agnes' child also reported loving school as she has good relationships with her teachers and classmates. Another mother, Faizah, did not share as positive an experience in her communication with teachers. As her child, Dimah, had been failing her Mathematics assessments over the years, she had also taken the initiative to communicate with her Mathematics teachers from primary one to primary four and wrote notes to them to inform them when she was unable to assist her daughter with a particular Mathematics question. She was, however, very frustrated when she was told by different Mathematics teachers over the years that Dimah could manage her work even when she had not improved much in her grades.

Written School Communication

Schools would often send letters to parents when there were activities, where parents' consent needed to be sought such as participation in school excursions or informing them of updates on other school matters. While such school communication may appear to be straightforward endeavours, reading such letters or forms could be a challenge for the families in the study due to the poor command of the English language. Even Min, who was one of the rare mothers who would check Google Translate to help her child in his English homework, spoke about how she and her husband had been called up by the teacher several times as they did not return certain forms or follow up on a particular course of action due to the fact that both her husband and her were handicapped in the English language. According to Min, the teacher would sound a little frustrated that Min and her husband had not acted as requested. Min mentioned she would usually try to consult her university-educated brother-in-law or occasionally her neighbour about the messages in school letters. However, even such help was rare as their work schedules may make it difficult for their leisure time to coincide. Sometimes, these letters were shelved into oblivion. Written feedback about homework was also not often understood as some mothers tried to check with the researchers on the meaning of teachers' comments.

Unfamiliarity with the School and Education System

While education is valued by the mothers, this was not necessarily matched by an adequate level of knowledge of the school and education system in Singapore to assist their children to make informed decisions. For instance, a mother had thought that if she could choose whichever school for her daughter to attend if she obtained permanent residency. Another did not fully comprehend the differences between Express, Normal Academic (NA) and Normal Technical (NT) streams.[2] She told her

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[2] Students in Singapore are streamed into the Express, Normal Academic (NA) or Normal Technical (NT) streams at secondary school level based on their Primary School Leaving Examinations

child that she should choose to go to Normal Academic since she could have more time than the students in the Express course to study the same curriculum. This limited possession of capital that aligned with that of the school and education system shaped the mothers' educational involvement.

Out-of-School Involvement

Monitoring of Homework and Assessments

Most mothers had been involved in some form of activities that monitor or assist their children in homework and preparing for assessments although some did it more consistently than others. This included checking daily journals where a list of assigned homework is recorded, helping to prepare any materials that were required to be brought to classes the next day and setting their children a homework schedule after school and during the school holidays.

Regularity of homework monitoring and assistance varied and depended on the hours (both duration and timing) the mother was working, the level of confidence the mother had in assistance provision and the father's involvement as "co-supervisor". Although she worked long hours, Min would make it a point to check her son's school diary to make sure he had done all the homework listed in it and to help prepare whatever things teachers may have requested for students to bring the next day. She also referred to the school diary to take note of his spelling or other tests in order to help prepare him.

Actual systematic supervision by single mothers was challenging to carry out as they had to juggle childcare with work as the sole breadwinner. As all the mothers were working and many in hourly paid jobs, they worked long hours which made it difficult to supervise their children at home.

Assistance with Homework and Assessments

A number of the migrant mothers reported helping their children to complete their assignments and helping them to prepare for spelling and dictation tests. However, the frequency and extent differed depending on whether the mothers worked and had the knowledge and confidence to help their child. There were a few mothers who were more active than others in assisting their children in their studies. Faizah,

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(PSLE) results. Express students complete their secondary school education within 4 years, while NA and NT students finished their course in 5 years. Curriculum is also differentiated across the streams. In recent years, measures have been introduced to enable more flexibility in terms of curriculum porosity as well as transfer across streams if students have performed well and met the criteria (Wang, Teng, & Tan, 2014).

who graduated from senior high school in Indonesia, was very concerned over her child's weak performance in Mathematics. In spite of her weak command of the English language and unfamiliarity with the way Mathematics was taught in local schools, she was self-taught in order to teach her child, Dimah:

> I became her teacher, you can ask her. I taught decimal, from fraction how to change to decimal. I don't know how, I learnt how to do it...

This is not an easy task for her due to her halting English. For instance, she did not understand what "percentage" and some other words meant in Dimah's progress report card. Another mother, Min, a Vietnamese, would conscientiously check Google Translate when she came across words she did not understand when helping her son with his homework even though her first language was neither English nor Mandarin.

Not all are equally involved in assisting in homework. The reasons given by the mothers ranged from a busy work schedule, a lack of confidence and unfamiliarity with school curriculum. Single-parent, Siti, did not seem to help Rinnie with her homework much. She claimed that this was because she was busy working. However, she also mentioned that she felt unable to help with the homework due to her low level of educational attainment and poor grasp of English.

> What can I do? Even if I want to help her, I don't know English much. Indonesian and Malay language, we learnt it differently. The case in Indonesia and here are different. So she does everything herself at home! For Malay too.

She relied on the school teacher to check the work done, and when it had been marked, she gauged Rinnie's learning progress by looking at the number of ticks and crosses marked by the teachers. She would scold Rinnie if she saw many crosses.

Li's anxiety over her child's studies was marked by a strong sense of helplessness. Due to her weak command of English, she simply felt she was not able to help her child with her homework much. Like Min and Faizah, Li similarly received at least 12 years of education, but unlike them, Li did not exhibit a similar level of confidence as Faizah and Min did in assisting their child. This appeared in line with findings in existing literature on how parental involvement could manifest differently among a group of people with similar cultural capital (in this case, educational level) in terms of whether or not and to what extent cultural capital has been activated and transmitted (Lareau, 2000; Khong, 2004).

Provision of Educational Materials and Environment

It appeared that a number of migrant mothers were acculturated into Singapore's assessment culture as the most common resources provided at home are assessment books. Some mothers talked about getting their children to do the exercises in the assessment books during school holidays and a couple even during term time.

Although quite in tune with the local assessment book culture, there was less consistency on the mothers' part reviewing the exercises completed by their children due to the lack of time or/and familiarity with the subjects.

One mother suggested that assessment books, while beneficial, could be a luxury if not utilised much. Siti initially provided a number of assessment books for Rinnie. Some were bought by her, while some had been donated by non-profit organisations. However, Rinnie did not do the exercises in them on a regular basis resulting in Siti's reluctance to buy more assessment books for her to avoid wasting money. Siti was satisfied if Rinnie just passed her tests.

Some of the mothers had been observed to engage in informal activities with varied learning content with their children. Siti, who felt she could not help her daughter much with her homework, for instance, had been witnessed using a deck of cards to engage in simple arithmetic games with her to familiarise her with numbers and their English rendition.

A few mothers arranged for their children to go to a student care centre near their homes after school as both a site of childcare and schoolwork supervision. A couple of mothers had encouraged their children to complete their homework there so that they could check with staff there if they had any queries about their work. Faizah often discussed with the student care centre staff about her child's learning progress. It appeared that staff at this centre had been helpful in working with Faizah over her daughter's behavioural and homework matters. Faizah had also attended workshops organised by the Children's Society and the Touch Service Family Centre to better support her child.

Other Learning Activities

An Indonesian mother sent her daughter to attend children's activities at a church on Sunday where she got to learn English songs and participate in games weekly. A few mothers mentioned bringing their children to the library occasionally on weekends. The meticulous mother, Min, had also previously brought her children to the library on weekends as she heard from social workers that this was more enriching than bringing them elsewhere and that it was cost-free. Library trips, however, were either infrequent or not sustained for most of the families. Reasons cited include mothers' long working hours and children being more interested in running around in the library instead of reading.

Outsourcing Educational Assistance

One interesting observation of the families participating in the study was that they were no strangers to the tuition culture that exists in Singapore—all except one mother had enrolled their child in tuition classes provided by non-profit

organisations at subsidised rates. In fact, a number of the migrant mothers enrolled their children in at least two forms of subsidised tuition. Fatimah's explanation of why she sent her child for tuition could be said to represent how other mothers in the study felt about the cultural capital they possessed:

> *Because I am not a local. If I am a local, I would have schooled here so I know how to teach the kid myself. So I want tuition because I don't know the ways they are taught, the right levels. For example, if the mother is a citizen, and school before and now are different, the difference is not much. There would already be the English language, Math…more or less… although before and now is different, it can be understood. I was schooled in Indonesia, so I want tuition, so Nora will know the studies from P1 to P6 is like this...*

It was this anxiety over the limited cultural capital to help her child that led Li to also enlist the help of a private tutor who could provide one-to-one English language tuition for her child on top of enrolling her in the tuition classes provided by the Chinese Development Assistance Council (CDAC), a self-help organisation for the ethnic Chinese. Such a move however was a financial strain on the family of five with Li's husband as the sole breadwinner, and Li constantly worried over whether the private tuition fee was worth the expenditure.

Provision of Computer and Internet Access

With the prevalent use of computer and Internet in local schools, school children often had to complete their homework on computer or participate in learning at online platforms. Access to technology and Internet can be a challenge for quite a number of these families, particularly the single-parent families. Often, the children had to complete assignments only in school or borrow laptops from different people like their neighbours or classmates to do their homework. One child was fortunate to have access to an old second-hand laptop as she and her mother often sought refuge at a church where the staff helped them. A single-parent family resorted to paying for limited computer and Internet access at an Internet café as there was no Internet access at their rented home. However this was not an ideal strategy as it was expensive and there had been instances when the child could not complete her work on the school online platform when the time was up.

Discussion

In spite of them facing multiple challenges and receiving little or no support from their children's father and/or in-laws, as the primary parent involved in their children's education, mothers in the study generally demonstrated concern and efforts over their children's education as they associated a higher level of education with better jobs and income in Singapore. Although the mothers face many challenges in involvement in the school, this does not necessarily mean low levels

of engagement or interest in their children's education. More parental educational involvement could be found in the home although the range of activities varied among families.

In spite of unfamiliarity with the local education system, they exhibited concern and willingness to be engaged with the school, debunking the "hard-to-reach parents" myth (Mapp & Hong, 2010). A couple of mothers even showed that they were willing to learn alongside with their children in order to assist them in their schoolwork. Overall, the mothers exhibited varied degrees of direct and indirect educational involvement, with greater parental involvement at home than in school due to limited alignment of cultural capital to that of the schools. However, the mothers' involvement was clearly constrained by a lack of continuity of cultural capital at home and school fronts and other challenges the families were confronted with.

Misalignment Between Parental Aspirations and Ability to Make Informed Educational Decisions

Much importance was placed on education by the mothers who believe that it will bring about a better future for their child (especially when compared with that back in their home country). While not all were able to articulate a clear educational goal for their child, all aspired for their children to go as far as possible in their academic career. There was a strong belief in Singapore's meritocracy and that education was the key in getting their children ahead. For one mother who is a single divorced parent, the firm faith in Singapore's education system had led her to consider the painful option of leaving her child behind with a friend in Singapore when it appeared unlikely she would be able to extend her visit pass in order to let her Singaporean citizen child continue her education here, while she returned home. She explained that she would rather let her child hate her for the separation now than she blamed her mother for missing out on better future prospects should she be brought back to her mother's country of origin. This showed how valued education in Singapore is by the mother.

Among those whose educational aspirations were more pronounced for their children, Fatimah, herself only receiving 10 years of education, hoped her child could go on to university. Min took her parenting role very seriously and believed education is the key to securing stable employment. She desired that her son can eventually graduate from a polytechnic or university as she did not see secondary school graduates as having much prospects in Singapore, a view shared by a few other mothers:

> …it's easier for him to get a job and find a job that is stable…a secondary school education is not enough.

With such aspirations and the will exhibited by some of the mothers in providing the best education their children can receive, these parents would welcome measures that could aid their children to achieve their potential.

Building School-Parent Relationships

Although their time is limited, the mothers in general demonstrated an interest in the development of the children in school. But as illustrated in the previous sections, being unfamiliar with the local education system and having a weak command of the English language, they appeared to be more passive and deferent to teachers even when they had a different opinion. As the international literature (e.g. Epstein, 1986; Sanders, Epstein, & Connors-Tadros, 1999; Swap, 1993) suggests, parents from low-income families and/or with less formal education could be more involved in their children's education if teachers' practices encourage and support them to do so. Understanding teachers also makes a difference to the quality of a child's schooling experience as the teacher of Agnes' child demonstrated.

For a meaningful constructive parent-teacher/school relationship to be forged to better support these low-income students, teachers could be more welcoming and schools made more accessible to these parents. One way to do this is to raise teachers' awareness of this group of families and the possible challenges they face in supporting the children's education. Understanding the profiles of such families could help teachers identify the needs of students and build better school-family communication. A sharing of preliminary findings of the study at the Redesigning Pedagogy Conference 2013 organised by NIE had received positive feedback from teachers who thought insights gained from the profile of these low-income families with migrant mothers helped them understand better the support students from these families need. More studies could thus be conducted covering a greater number of these families to establish a fuller picture of how these students with limited support from parents are doing in terms of their educational progression and the existing support in the families and schools for them. Findings can feed into multicultural education or diversity course curriculum for preservice teachers. In-service teachers could also be made more sensitised to the complexities of situations within such families through workshops conducted by researchers.

To facilitate a higher degree of continuity of learning experiences for the children between home and school, relationships and communications between these migrant mothers and schools could be enhanced by creating opportunities to engage these usually more reserved parents to contribute to school activities in meaningful and empowering ways. For instance, migrant mothers could be roped in for celebrations of relevant events such as the Racial Harmony Day or International Friendship Day typically observed in Singapore schools. They could be invited into the school to share their life stories and culture of origin in the form of teaching students simple phrases of their mother tongue or introducing ethnic dishes from their hometown. In this way, these parents could become very rich resources for students to learn about diversity in Singapore and be appreciated for their cultural capital, while this is also a good opportunity for them to familiarise themselves with the school culture.

Building Cultural Capital and Integrated Support Through School and Community Sites

Unlike Singaporean bred and educated local parents, these migrant mothers had little prior lived experience of the education system here, which in turn affects their ability to make informed decisions when charting out the options their children have in education trajectories. Official attempts to build more integrated support for the child through the school-based student care centres are a positive development in building cultural capital. School-based student care centres have increased more than threefold between 2012 and 2018, and the aim was to eventually institute such centres in all Singapore primary schools by the end of 2020 (Yuen, 2018). Students from low-income families could apply to the Student Care Fee Assistance for up to 98% subsidy of the monthly fee. Apart from such centres, perhaps more assistance could be provided to existing community-based student centres. As quite a number of the mothers send their children to student care services of organisations in the neighbourhood, it would be very helpful if these sites could double up as a hub where these parents could obtain more information about local education system more conveniently. As shown in the chapter, written school-parent communication could be a challenge with the mothers' limited command of English. Staff at these sites could also offer assistance in deciphering written communication from schools. The provision of education advice could also be considered at these sites on a weekly basis if not on a daily basis. Parents from low-income households could gain much from these student care centres located in the neighbourhood and thus more accessible, convenient and perhaps less daunting than the schools.

While it is good to know that the mothers in the study were able to enlist external assistance for their children in the form of tuition services at non-profit organisations, there has also been feedback by mothers that the quality of such group tuition may not meet their expectations. There are usually large number of students in these subsidised tuition classes, and each individual child received inadequate attention. One mother also complained of some students causing disruptions in class, thus affecting her child's ability to concentrate and learn. Given the economic circumstances of these families, it is likely that these tuition classes are the most affordable external educational assistance the parents could engage. Thus, it is a good sign that since then, government has set aside more money to self-help ethnic organisations in recent budgets and the various self-help groups have come up with a joint effort known as the Collaborative Tuition Programme to better cater students from vulnerable families. More non-profit organisations could also offer English language workshops for these migrant mothers to enhance their confidence and ability to support their children.

The study revealed that these families often had limited computer and Internet access. With more school assignments needing to be completed with the help of computer and Internet these days, it would be convenient if the self-help ethnic organisations and student care centres could offer these facilities for free; this could save much time and money for the students. Parents would also then need not resort

to find a separate time to bring their children to an Internet café which a couple of the mothers in the study reported doing. Tan (2013) had attempted to localise the meaning of cultural capital in the Singaporean societal context, and he identified "access to and dispositions toward ICT" as one of the key forms of cultural capital. Thus, ensuring computer and Internet access helps to mitigate the inequity of unequal possession of cultural capital.

Identifying and Supporting These Children in Preschool Education

For the mothers who had more than one child and whose elder child was in primary school during our period of study, they had expressed the anxiety over how their older children lagged behind when they first entered primary school with their weak command of the English language. Most of their children's classmates were more advanced in English proficiency, while their children were still struggling with the basics and this was a cause for worry since all the subjects except for Mother Tongue are taught in English. Although their older children after the initial couple of years of adjustment were passing all subjects and obtaining around 70s for English, the mothers decided their second child needed some form of preparatory classes before they start primary school to compensate for their lack of cultural capital at home. With the recent governmental efforts to boost preschool education to help every child, it would be good to identify children from such vulnerable families and engage their parents earlier in order to provide the assistance they need. In doing so, translation would be crucial in identification measures as many low-income families do not use English as their primary language as reflected in Poon's Chap. 10.

Counteracting the Effects of Non-Educational Factors on Education

While the mothers in the study exhibited common issues that low-income families in Singapore could face, such as the lack of social and cultural capital aligned with the school system, they often have further challenges due to their dependence on their marital status and relations to their husbands, which in turn affects childcare arrangements, access to jobs and housing and rights to residency in Singapore. This makes it harder for some of these mothers, particularly the single parents among them, to provide a stable home environment, which in turn restricted their parental involvement. More could be explored on how different agencies such as the family centres, student centres and schools could work together to support the families. While the mothers' woes appear to be beyond the purview of the education sector, the welfare of the mothers intimately affects the children.

The fact is that children of such international marriages may not be as visible to the school since they would carry the surnames of their fathers and some of their mothers may even fit into the major ethnic categories in Singapore. Thus, the complexities surrounding such families would require teachers to be equipped with greater awareness over Singapore's newer population diversity in order to identify and better support these vulnerable students. To do this, further research should be conducted on diverse low-income families and research findings shared with educators.

Conclusion

In the age of parentocracy, we should all be reminded that parental educational involvement is a socially constructed notion and one that is co-constructed by different stakeholders including families, schools and other community and societal institutions with collective responsibilities.

Given the variation in socio-economic status across families, parental involvement varies. It is usually the better-offs with the social and cultural capital who could usually take a more interventionist approach and be able to navigate the discourse and practice of parental involvement. Thus, when encouraging parental involvement, schools need to understand the nature of educational involvement that could vary with different background due to differences in cultural capital, social capital and habitus and should avoid taking the middle-class parental educational involvement as the norm.

While supporting low-income parents to assist their children, the diversity among them and the variation in challenges confronted, such as those faced by the migrant mothers mentioned in this chapter, should be considered in order to render appropriate assistance. This also meant that any solutions or interventions at classroom or school level probably only resolve part of the issues that students from such families face. It is thus perhaps timely and necessary to tackle equity issues of the times through a combined lens of the sociology of education and sociology of the family research examining factors in school and beyond which shape educational experiences.

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Chapter 10
Policies and Initiatives for Preschool Children from Disadvantaged Environments and Preschool Children with Disabilities in Singapore

Kenneth K. Poon

Competence is defined as "a pattern of effective adaptation in the environment, either broadly defined in terms of reasonable success with major developmental tasks expected for a person of a given age and gender in the context of his or her culture, society, and time, or more narrowly defined in terms of specific domains of achievement" (Masten and Coatsworth, 1999, p. 206). Employing this definition, competence can mean examining quite different aspects of children at different levels of development. Aspects of competence identified by Masten and Coatsworth (1999), for schoolchildren include school adjustment (e.g. attendance, conduct), academic achievement (e.g. learning to read, doing arithmetic), getting along with peers (e.g. acceptance, making friends) and rule-governed conduct (e.g. following rules of social for moral behaviour and prosocial conduct).

Within Singapore, competence among preschool children has been defined as the key stage outcomes of preschool education (Ministry of Education, 2012). These include a sense of being comfortable and happy with themselves; knowing what is right and what is wrong; being willing to share and take turns with others; being able to relate to others; and loving their families, friends, teachers and school which are foundational in the development of social relationships. In addition, the academic foundations of being curious and able to explore, being able to listen and speak with understanding and having developed physical co-ordination and healthy habits and participated in and enjoyed a variety of arts experiences have been emphasised.

Yet, these key stage outcomes are not achieved by every child, and children who likely have difficulties achieving these aspects of competencies upon entry into primary education are often identified as potentially benefitting from some form of early intervention. Who are these children? What is currently known about how best to support the development of their competencies? What are the directions forward?

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This chapter seeks to address the above questions within the context of international research and apply them against that of Singapore.

Early Childhood Intervention

Early childhood intervention refers to services, often multidisciplinary, provided to children who have not yet started formal education to "promote child health and well-being, enhance emerging competencies, minimise developmental delays, remediate existing or emerging disabilities, prevent functional deterioration and promote adaptive parenting and overall family functioning" (Shonkoff & Meisels, 2000, p. xvii–xviii). Children who typically access early intervention are those who have an identified disability or those with an identified risk such as being from a disadvantaged environment.

Improvements (or the lack of deterioration) of current child developmental outcomes in the motor, social, language, cognitive and adaptive domains represent one crucial aspect sought in early intervention. Another aspect of outcomes sought in early intervention would be the key stage outcomes of preschool education highlighted above (MOE, 2012). From this perspective, competence can also be perceived as a process resulting from interactions between the child and the broader context over time (Pianta & Walsh, 1998; Resnick, 1996). When defined as such, early intervention can be conceptualised as any programme that seeks to enhance the child's developmental and/or functional capacities (and hence competence) via direct teaching or contextual support.

Children Benefiting from Early Intervention

Although there is considerable disparity in how intervention is defined, children who benefit from receiving early intervention would include those with identified disabilities and, commonly, those with environmental risk. There are currently no formal studies of the prevalence of disability in Singapore. However, it has been estimated that approximately 3.2% young children (0–6 years) have been diagnosed with a form of disability in Singapore (Steering Committee on the Enabling Masterplan 2012–2016, 2012). Of the preschool children referred to the national Child Development Programme between 2004 and 2006, the majority (27–29%) present with ASD or speech and language delays and associated disorders (24–29%, Ho, 2007).

In contrast to children with disabilities, there are no published figures of preschool children at risk. However, approximately 12–14% of pupils who begin Primary 1 are identified by the Learning Support Programme (LSP) (Ministry of Education, 2008) to require learning support. Under the LSP, children are taught the elements of literacy such as recognising and writing letters, decoding and spelling as well as building their English vocabulary. To qualify for the LSP, all Primary 1 pupils are screened and those lacking these fundamental skills are identified. Likewise, there

is a similar Learning Support Programme for Mathematics (LSM) seeking to provide support in numeracy acquisition. These figures provide an estimate of the incidence of children with risk of academic failure and its associated difficulties in primary schools. It is without any doubt that any early intervention would be an ideal strategy for such children.

A comparison of the reported incidence based on the Child Development Programme (Ho, 2007) suggests a gap between the numbers of children being diagnosed and international figures of about 12% of the age cohort. This is a phenomenon that merits further investigation. As most children in Singapore have some access to preschool education, preschools offer a good platform for identifying preschool children with disabilities.

Screening, Identification and Referral

Within such a developmental systems approach, children can only be identified if an effective screening and referral programme is in place. To aid the development of such a programme, a standard set of instruments and/or identification procedures sensitive to the cultural and situational context of the children and their families need to be in place. There are a range of screening tools which vary in the ages of children they are designed to screen, as well as the range of domains they screen. Children who do not meet the criteria for early intervention may still present with some risk. In such a case, a system for making decisions about the level of monitoring in a surveillance programme needs to be in existence.

The system of screening in Singapore is relatively well-developed with both universal screening as well as targeted screening for children with disabilities. There is a developmental screening programme in Singapore, aided by the provision of a child health booklet to all children born in Singapore. The development of children is monitored from birth to 4 years old. Booklet items were adapted from the Denver Developmental Screening Test (Lim, Chan, & Yoong, 1994; Lim et al., 1996) adapted and normed for use with a Singapore population. There is a prescribed section for physician examination at 1, 3 and 18 months and then at 4 years. In addition, parents are also prompted to complete checklists within the Health Booklet at 1, 3, 4, 5, 6, 9, 12, 15 and 18 months and 3 and 4 years. These checklists contain items that are spread across the developmental domains (e.g. pointing to parts of the body) to screen for delays in development.

Many children with developmental difficulties are identified in preschools where parents are advised to consult their primary care physicians. However, there have, until recently, been no formal procedures for screening young children attending preschools, but all early childhood educators with a diploma in early childhood education receive some training in special needs (Preschool Quality Accreditation Committee, 2008). The Developmental Support Programme (DSP) was officially launched in 2013 (MSF, 2013) and is currently being rolled out to preschools run by the anchor operators. This programme seeks to provide focused and short-term support for children at risk or those identified with mild developmental issues in

their preschools. Once children are identified by teachers and parents have consented, they are screened by learning support educators (LSEd) who are early childhood educators. The findings are interpreted during a case-filtering meeting that includes therapists and a developmental paediatrician. The children screened to require some short-term support will be referred to either intervention session by a psychologist, therapists or LSEds. Children that present with needs that cannot be supported within the DSP are referred to the Child Development Programme for further diagnosis and, if required, support within more specialised settings.

Although Singapore has in place a fair screening and surveillance system, the accuracy of such a system is dependent upon the availability of appropriate instruments, valid and appropriate for Singapore. The following are two strategic areas for support within preschool environments. First, the development of community networks of stakeholders and the use of the child Health Booklet are recommendations made by EM 2012–2106 as a means of enhancing the early detection of young children with disabilities and those at risk. However, not all parents are compliant with the developmental screening services, particularly those from disadvantaged backgrounds. So there is a need to examine the impact to which the child Health Booklet may be employed as a screening and monitoring tool. Perhaps one such strategy would be to collaborate with preschools to employ the child Health Booklet as a screening measure. Next, the services for identifying young children with disabilities have been evolving since its inception in the 1990s, and whilst there have been great strides in service provision, child assessment in Singapore is hampered by the unavailability of locally developed/adapted and normed instruments. Although an assumption may be made that the developmental sequence and timing of infants should be fairly universal with some degree of individual variation, this assumption will not hold with toddlers and older children as differences in socialisation patterns can potentially lead to differences in developmental outcomes (Ghosh & Magana, 2009). There needs to be work on the development/adaptation of instruments for assessing the development of young children in Singapore. This would be true for all domains but is especially important in the case of language tests where the bilingual environment of Singapore makes the assessment of the language domain challenging.

Apart from instruments needing to be normed for Singapore preschool children (which would be true for any instruments applied for the Singapore context), many preschool children in Singapore may not have had sufficient exposure to the English language. As such, any instrument testing young children needs also to be translated into the languages spoken by children in Singapore.

Point of Access and Comprehensive Assessments

The point of access to early intervention should be when the information collection process begins. This would help to arrive at a decision on the needs of the child and the form of early intervention services required. This is typically followed by a

comprehensive interdisciplinary assessment which seeks to understand, amongst other things, the child's developmental profile and family functioning. This helps to gather information for diagnostic purposes, with the end of making recommendations.

The Child Development Programme (CDP) serves as the point of service access for young children with developmental disabilities (Ho, 2007). Children identified by any screening programmes (e.g. DSP) or primary providers (e.g. general practitioners or polyclinics) with developmental problems can be referred to the CDP. The CDP comprises Child Development Units located at two major hospitals (KK Women's and Children's Hospital and the National University Hospital) staffed by paediatricians who manage the cases and are supported by a team of professionals comprising psychologists, speech-language pathologists as well as occupational and physical therapists. They are also supported by medical social workers and nurses. One of the major functions provided by the Child Development Units is a comprehensive multidisciplinary evaluation with the paediatrician serving as case manager.

Mirroring the CDP but in a more decentralised manner, the 41 family service centres (FSC) serve as a point of access for children with environmental risk. FSCs are community-based providers of social service for disadvantaged families (MSF, 2014a). Families who approach the family service centres are assessed by the social workers and have their needs identified. Their services include casework and counselling, information and referral as well as community support programmes. However, as each FSC is run by individual voluntary welfare organisations (VWO), each FSC may also run other services. Families who approach the family service centres are assessed by the social workers and have their needs identified.

It is evident from the earlier description that Singapore has a well-developed developmental assessment programme for young children with disabilities, as well as those at risk. However, there remains room for further development. As mentioned above, the DSP is in the process of being rolled out in the preschools run by anchor providers. However, the child must be attending a preschool run by the anchor operator to benefit from DSP. This excludes children not attending preschools not run by the anchor operators as well as those currently not enrolled in a preschool.

Early Childhood Intervention for Children with Disabilities in Singapore

The recent years have been characterised by a surge in the capacity of existing programmes as well as an increase in the number of options for young children diagnosed with disabilities and for those with risk. Parents frequently need to pay for these programmes (with the exception of preschool programmes) but receive a subsidy along a sliding scale. There currently exists a continuum of programmes and services for preschool children at risk for academic difficulties and those identified with disabilities.

It is likely that most young children with mild disabilities receive their education in preschools alongside their typically developing peers (Ho, 2007). However, the exact number, and their profile of strengths and needs, remain unknown. Issues such as structural obstacles (e.g. large class size, poor teacher-student ratio) and personnel (e.g. limited training, high turnover) have been identified as barriers including young children with disabilities within preschools (Poon & Yang, 2016; Yeo, Neihart, Tang, Chong, & Huan, 2011). Preschools have individually developed efforts to support these children. Efforts are also underway to develop pilot models of supporting preschool children with disabilities in inclusive environments. As mentioned above, the DSP is a preschool-based programme that screens children who are at risk or who exhibit mild developmental concerns. If the results of the screening process indicate a mild developmental concern, they can be offered support from the LSEd or therapy intervention with a therapist followed by in-class support from an LSEd for 1 h per week.

Some preschool children identified with special educational needs also receive therapeutic support from allied health professionals, such as speech-language pathologists and occupational and physical therapists. Hospitals typically provide the services to young children not receiving support from the Early Intervention Programme for Infants and Children (EIPIC) centres, which are typically staffed by therapists or by services from other providers. With the establishment of two therapy hubs operated by VWOs in 2005, there are increased options apart from therapists in private practice. The Integrated Child Care Programme (ICCP) was established to provide inclusive education alongside typically developing children for young children with mild to moderate disabilities who benefit from placement in mainstream environments from 18 months till the year they turn 7 years. There are currently 17 ICCP centres operated by seven providers (SG Enable, 2011). The providers include mainstream childcare centres serving children aged 2–6, and they receive additional funding to provide ICCP for young children with disabilities. Parents pay for ICCP services along a sliding scale and receive subsidies. There is a range of service models ranging from centres with in-house learning support units to those who purchase services from external providers.

EIPIC centres are funded by the EIPIC government funding. They constitute the cornerstones of ECI provision for young children with developmental disabilities, supporting about 40% of the young children diagnosed with developmental disabilities in Singapore (EM 2012–2016 Steering Committee, 2012). There are 17 EIPIC centres with a total capacity of 2300 children, and the numbers of places are expected to increase to support 2700 children in the medium term (Ibid). Due to the nature of the service model, there is considerable heterogeneity in service provision. However, these centres share several common features (Poon & Yang, 2016). Young children with predominantly moderate to severe disabilities receive intervention in these centres (Ho, 2007). The service model is generally centre-based educational and therapy support where children receive specialist instruction in either small groups or individually. Teachers receive training in early childhood special education. There is also an element of parent training in each centre. EIPIC centres employ a range of intervention approaches (typically behavioural and/or

developmental). There is an ongoing public-funded initiative by one of the Child Development Units to help build the capacity and improve the quality of EIPIC centres (EM 2012-2016 Steering Committee, 2012).

As such, there is a continuum of early intervention options for young children diagnosed with disabilities ranging from comprehensive to inclusion and focused therapy programmes. As the field of early intervention continues to mature, research has highlighted some areas to focus on. In particular, Yang and Poon's (unpublished data) survey of 91 preschool contexts providing support to preschool children with disabilities highlighted some barriers reported by principals/managers of preschool settings. First, teachers need to be trained to both identify and support their development across the different domains. They also need to know how to work collaboratively with parents and professionals supporting the child.

The availability of trained personnel within these preschool environments is crucial for their support. These personnel could be teachers with additional training and experience in supporting students with disabilities or those at risk, or they could also be specially trained individuals such as DSP's learning support educators to support the screening and intervention within these centres or psychologists. The availability of such personnel is important; studies have established that accumulation of experience, and acquisition of knowledge and skills, builds teacher efficacy or confidence that they can competently support students with SEN. This in turn produces positive attitudes towards inclusion (Avramidis & Norwich, 2002; de Boer, Pijl, & Minnaert, 2011). However, centres frequently experience issues pertaining to staff turnover. As such, apart from recruiting and training personnel to support young children with disabilities, there needs to be a system put in place to retain them.

Another important factor is the availability of resources. Respondents to Yang and Poon's study also reported workload and teacher-student ratio to be an issue in the support of preschool children with disabilities, particularly in inclusive preschool environments. Other resources can include the availability of adequate physical environments (e.g. distraction-free environment, spare room for individual teaching), materials (e.g. manipulatives, specialised teaching materials) and reference materials (e.g. guidebooks, video material).

Finally, the policy and organisational processes need to be developed. These could include sufficient time for meetings between teachers and parents, developed processes for the screening of children requiring more help and procedures for referrals. A third aspect highlighted by the respondents was the attitudes, perceptions and understanding of personnel supporting young children with disabilities, their colleagues as well as that of parents, both of children with and without disabilities. A positive attitude towards their support would work towards a greater collaboration for supporting them both within the school and home environment. Finally, Poon and Yang (2012) reported in their survey of service delivery models within EIPIC-funded centres that the majority of young children with moderate/severe disabilities are educated in environments away from their typically developing peers. This highlights the need for there to be greater initiatives for the inclusion of young children with disabilities within educational environments and beyond.

Prevention Programmes in Singapore

With the social well-being of each family member across the lifespan being the focus of each FSC, financial support represents one of the strategies for supporting the families of preschool children. For instance, subsidies for preschool children attending kindergartens or childcare centres are available for families with lower income levels (MSF, 2014b). In addition, the DSP also represents one major effort to directly support preschool children who are at risk. Another programme supporting children at risk is termed Focused Language Assistance in Reading (FLAiR). Established for children in preschool kindergartens with difficulties in the English language, MOE developed the FLAiR in anchor preschool operators such as PAP Community Foundation and My First School. Under this scheme, K2 children, mainly those from low-income and non-English speaking homes, who are selected, would be provided with support in the oral use of the English language and reading.

Some FSCs offer structured programmes to support children with environmental risk. However, due the heterogeneous nature of FSCs, the types of programmes vary. They typically include parental counselling and financial assistance programmes. In addition, FSCs may provide additional programmes such as parenting, tuition, life skills, social groups, etc. For example, some FSCs run the Positive Parenting Programme, an empirically validated behavioural family intervention programme (Sanders, 1999). There is also some preliminary evidence suggesting that the Triple-P is acceptable in Singapore, but some barriers exist in its application (Poon, 1999).

The preceding discussion suggests that there are in existence a number of focused programmes supporting children with environmental risk. However, there is a now the emergence of a programme to systematically support these children by identifying and supporting them in a more systematic fashion such that they can be triaged into differing levels of support, depending on their needs (e.g. from focused support to comprehensive programmes and even child protection services). KidStart, a programme developed for children from birth to 6 years from vulnerable families, was launched in 2016 (Early Childhood Development Agency, 2017). It seeks to provide opportunities for child development by supporting the immediate family environment. This can take the form of home visits, supported playgroups and enhanced preschools. As the earlier literature review suggests, the interactions that take place within the home environment of the preschool child occupy a very important place in the development of the child. Unpublished data of children in the 1st year of kindergarten in Singapore suggest that family perceptions of what is required for entry into primary school are associated with their conceptual skills, even after the child and other family factors have been taken into account (Wright et al., 2009). An implication of such a finding is that family support is an essential aspect of facilitating the development of the child.

Monitoring and Evaluation of Outcomes

The outcomes of early intervention programmes need to be monitored and evaluated. In addition, a transition from early intervention to the next setting needs to be planned. One of the weakest components of early intervention programmes in Singapore is the aspect of evaluation and monitoring. The current state of outcomes monitoring in early intervention programmes is, when it exists, decentralised. The lack of instrumentation for monitoring child and family outcomes within preschool environments complicates the issue. EIPIC centres and some ICCP centres conduct their own monitoring system via individual education plans or individual family service plans. There was an effort to encourage a standard platform of outcome management in the mid-2000s with the introduction and training in the use of the Assessment, Evaluation and Programing System (AEPS) (Bricker, Pretti-Frontczak, Johnson, & Straka, 2002). However, as in the case of standardised tests for the comprehensive assessment, there are no measures of outcome validated for the Singapore context. The AEPS, which prescribes a curriculum for children up to 6 years, is also not fully appropriate for the cohort served by EIPIC who may be as old as 6 years and 11 months. The introduction of a centralised evaluation and monitoring system and the development of instruments validated for and normed in Singapore would aid the process of outcome management. However, the availability of such infrastructure does not entail that evaluation will take place nor does the availability of evaluation data necessitate a feedback process. The degree to which this is carried out requires further study.

Transition Planning in Singapore

One challenge in the support of young children with disabilities is the involvement of multiple government bodies. For instance, the Child Development Programme is resident within the Ministry of Health (MOH). In contrast, EIPIC and ICCP services are funded by the MSF. Special schools are run by VWOs but jointly funded and regulated by the National Council of Social Service (NCSS), MSF and the Ministry of Education (MOE). Given the large number of agencies involved in the support of young children with disabilities, the transition between environments, particularly from the early intervention environments to the primary school, can be a challenge. Although SG Enable was established with one of its roles as coordinating the referrals for young children with disabilities from point of access agencies to the EIPIC and ICCP centres, information gets transferred only when parents provide written permission. Further, the EIPIC centres as well as the Child Development Units have worked with MOE to facilitate the transition of the young child with disability between different learning environments.

Conclusion

The provision of early childhood intervention has progressed significantly in post-war Singapore. Recent decades have been characterised by rapid gains in the support of young children with risk and those with disabilities. With the introduction of EM 2012–2016, it is likely that more wide ranging reforms to the ECI sector will take place, bringing further development. Yet, it would be premature for Singapore to rest upon its laurels as this progress within the field of ECI, however significant, still leaves room for improvement.

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Chapter 11
Helping Children with Mathematical Difficulties Level Up: Evaluating the Efficacy of a Novel Updating Training Programme

Su Yin Ang, Kerry Lee, Kenneth K. Poon, and Imelda Suryadarma

Introduction

Singapore is one of the most affluent countries in the world and is ranked by international-benchmarking examinations such as Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) as one of the top-performing education systems in the world (Mourshed, Chijioke, & Barber, 2010). In its educational success, notwithstanding, there is concern of the inequality within the education system. One source for concern was raised in the Organisation for Economic Cooperation and Development (OECD) report of PISA performance where Singapore was described was a country with an above-average relationship between academic performance and socioeconomic status (OECD, 2010). Despite a very high participation rate in kindergarten, there is also suggestion that not every child enters primary education with the same level of academic skills. Learning Support for Mathematics programme has been established within all primary schools in Singapore so that children who are screened at Primary 1 without the adequate foundational skills in math would receive specialised support (Cheam & Chua, 2009). Kaur and Ghani's (2012) investigation of children with poor attainments in math reported that these students were not attentive in class and easily distracted. They did not give their best when doing work and often not able to complete their work on time in class. Perhaps

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related to these difficulties, these pupils also lacked home support with their work, with many coming from low-income families.

It is within this context of individual differences in children's math performance at entry to formal schooling that the present study was conceptualised. The developmental systems model for early intervention (Guralnick, 2001) posits that the environment plays an important role in child outcomes. The other chapters within this book address various aspects of environmental threats. In this chapter, we describe an alternative approach of supporting children who lag behind in the acquisition of academic skills. Instead of directly addressing the gap in academic skills which is currently being addressed via the LSM and Learning Support Programme (LSP) for those lacking the prerequisite literacy skills or environmental factors such as home environment or parental perspectives, we have chosen to focus on supporting the development of cognitive functions which we understand to have a predictive relationship with subsequent academic outcomes. We begin by describing working memory and its relationship with academic achievement. Following that, we will briefly review the research base on how working memory and updating skills may be improved. Finally, we will describe our efforts at improving updating skills via computer games specially developed for that purpose.

What Is Working Memory?

Working memory is one important aspect of conventionally termed "thinking skills" which is important for academic performance and everyday tasks such as language comprehension, problem-solving, mental arithmetic and reasoning. Working memory is defined as the capacity for a person to hold and manipulate information in the mind (Baddeley, 2000). Working memory is needed for the daily task of rearranging the grocery list into sections of the supermarket where the food items are available, in academic activities such as figuring out what is asked for in a problem sum in elementary school mathematics or in making connections between two lines of argument in a philosophy paper.

Models of Working Memory

There are several theoretical models of working memory (e.g. Baddeley & Hitch, 1974; Engle, Cantor, & Carullo, 1992; Miyake & Shah, 1999; Shah & Miyake, 1996), but the model incorporating Baddeley and Hitch's (1974) model would be employed. In this model, working memory consists of the *phonological loop* and *visuospatial sketchpad*: cognitive systems which are responsible for the storage of verbal (e.g. words) and visuospatial information, respectively. In addition, there is a third component, the *central executive* that controls attention and processes involved in working memory. The *episodic buffer* (Baddeley, 2000) is the fourth component which combines information across domains into integrated chunks.

Central Executive: Executive Functions and Updating

In recent years, more research has been done to identify more specific functions of the central executive. Miyake et al. (2000) proposed three key separate but related executive functions: inhibition, shifting and updating. *Inhibition* is the ability to suppress responses through mental control, such as blocking distractions to the task at hand. *Shifting* refers to the ability to switch between multiple tasks, operations or mental representations, such as copying information from the board to the exercise book. Lastly, *updating* is defined as the capacity to refresh and monitor information in working memory with new or more relevant information.

Working Memory/Updating and Academic Performance

One important reason for the study of working memory and updating is that these cognitive components are closely related to children's performance in reading (Gathercole & Pickering, 2000), mathematics (Bull & Scerif, 2001; Geary, Hoard, Bryd-Craven, & DeSoto, 2004; Lee, Ng, Ng, & Lim, 2004; Passolunghi & Siegel, 2001; St Clair-Thompson & Gathercole, 2006) and general academic achievement (Gathercole, Brown, & Pickering, 2003; Gathercole, Pickering, Knight, & Stegmann, 2004). Our previous studies found that working memory and updating capacities predicted proficiencies in mathematics, algebra word problem-solving and reading comprehension in children (Lee & Peh, 2008; Lee et al., 2004; Lee, Ng, Pe, Ang, Hasshim, & Bull, 2012). Lee et al. (2012) found that in fact measures of updating predicted academic performance better than did measures of working memory. Because of these previous findings, our intervention programme is more targeted and focuses at improving updating capacity.

Working memory has also been shown to be a good indicator of children's potential for learning (Alloway & Alloway, 2010). For example, 4–5-year-olds with poor working memory are found to be unlikely to reach expected levels of attainment in literacy, math and science 3 years later (Gathercole et al., 2003). Children with poor working memory tend to struggle in learning activities that place heavy demands on working memory (Alloway, Gathercole, Kirkwood, & Elliott, 2009), as they might have difficulty remembering and following lengthy instructions (Gathercole, Durling, Evans, Jeffcock, & Stone, 2008). Because new concepts and procedures are introduced frequently in the classroom, these children tend to have difficulties keeping up in the classroom (Gathercole & Alloway, 2008).

Environmental Factors Associated with Working Memory

Apart from the relationship between working memory and academic performance, it is well established that academic performance is associated with socioeconomic

status (SES) (Bradley & Corwyn, 2002). This gap is of particular concern as it not only persists but widens over time (Pungello, Kupersmidt, Burchinal, & Patterson, 1996). It has also been well established that working memory is also associated with broader environmental influences. Akin to research reported earlier, family income levels have a positive relationship with working memory performance amongst both pre-school- and school-aged children (Farah et al., 2006; Noble, Norman, & Farah, 2005). This disadvantage subsequently has an impact upon outcomes in adulthood and is hypothesised to be mediated by chronic stress (Evans & Schamberg, 2009). Although the specific developmental influences between factors such as working memory and SES remain to be clearly articulated, it is evident from research that they play important roles in academic outcomes.

Improving Working Memory and Updating Capacity

Although controversial now, there was a long-held view that memory capacity is heritable and fixed (e.g. Miller, 1956). Early studies on memory training tend to see improvements only in tasks similar to those used in training (Butterfield, Wambold, & Belmont, 1973; Ericsson, Chase, & Faloon, 1980). More recent research has found that intensive training can improve performance in various functions, as evidenced by synaptic changes as well as changes in the functional organisation of the cortex (Buonomano & Merzenich, 1998). Some have viewed this as evidence of neuroplasticity or the brain's ability to reorganise itself and change as a result of input from the environment (Klingberg et al., 2005). At a behavioural level, such training effects have been differentiated between near- and far-transfer effects. Near-transfer effects refer to improved performance on trained tasks and tasks structurally similar to the trained tasks, whereas far-transfer effects refer to improved performance on tasks that have different task characteristics compared to the trained tasks such as fluid intelligence or attention measures.

Effects of Working Memory Training

In a seminal study, Klingberg, Forssberg and Westerberg (2002) studied the effects of a working memory training paradigm that focused on intensive and adaptive training of working memory tasks in children with ADHD and adult male university students without ADHD. Participants improved their performance on both the trained and untrained visuospatial working memory tasks as well as far-transfer effects to performance on the Raven's Progressive Matrices, suggesting that the training effects can be generalised across different populations. The training also decreased reaction times and reduced motor activity in the children with ADHD. In a follow-up study, Klingberg et al. (2005) administered Cogmed to 7- to 12-year-olds with ADHD. Cogmed is an adaptive computerised working memory training

programme consisting of a series of visuospatial working memory tasks and verbal tasks. Once again, the training resulted in near- and far-transfer effects as well as a reduction in symptoms of inattention and hyperactivity/impulsivity. Since these two early studies, other studies employing Cogmed have found evidence of the effectiveness of cognitive training with varying degrees of near- and far-transfer effects in different populations (e.g. Buschkuehl et al., 2008; Holmes, Gathercole, & Dunning, 2009; Olesen, Westerberg, & Klingberg, 2004; Thorell, Lindqvist, Bergman Nutley, Bohlin, & Klingberg, 2009; Westerberg & Klingberg, 2007). Another group of researchers used the *n*-back updating task where participants were tasked to decide whether the current stimulus matched the one that was presented n items back in the series (Jaeggi, Buschkuehl, Jonides, & Perrig, 2008; Jaeggi, Buschkuehl, Jonides, & Shah, 2011). They found that such training improved fluid intelligence and that this improvement corresponded to the dosage of training and improvement in performance on the training tasks. They also suggested that it is important to assess the training regimes and conditions that contribute to better training transfer effects (Ibid).

Working Memory Gains and Academic Achievement

As working memory and updating have been shown to be highly correlated with academic performance, it is possible that improving working memory and updating capacity will lead to improvement in performance on academic tasks. However, few studies have found the transfer of training effects to classroom or academic tasks (Chein & Morrison, 2010; Holmes et al., 2009; Van der Molen, Van Luit, Van der Molen, Klugkist, & Jongmans, 2010). Some studies using Cogmed have found near-transfer effects, but transfer in terms of improvement in classroom-related activities or academic tasks has been less consistent (e.g. Dunning, Holmes, & Gathercole, 2013; Holmes et al., 2010). Dunning et al. (2013) found that Cogmed improved performance on a range of untrained WM tasks, but not tasks based on classroom activities or other cognitive assessments in 8-year-olds. Improvement in verbal WM was also sustained for about a year in a subgroup of participants. In contrast, Holmes et al. (2009), working with 10-year-olds, found no immediate far-transfer effects to reading, mathematical reasoning, or intelligence but found an improvement in mathematical reasoning scores 6 months after training. However, because the control group was not retested at the delayed post-test, it is unclear whether the improvement is due to training.

More encouragingly, a recent two-part study by Holmes and Gathercole (2014) found that teacher-administered Cogmed training improved performance on various working memory tasks in 8- to 9-year-olds as well as improved English and math National Curriculum tests scores in low-achieving 9- to 11-year-olds. However, there was no control group in the first part of the study, so it is uncertain whether improvement in working memory task performance was indeed due to the intervention. As working memory was not assessed in the second part of the study,

it is unclear if the far transfer of training effects occurred with or without the near-transfer effects. Nonetheless, this study demonstrates the potential of such training programmes as a possible means of helping low-achieving children level up, particularly if the programmes can be automated and easily administered by teachers. Because findings are currently mixed, further research is required especially with younger low-achieving children.

Massed and Distributed Practice in Working Memory Training

Klingberg et al. (2005) have proposed that working memory training needs to be rigorous, intensive and systematic as well as adaptive to allow one to work continuously at optimal capacity. Repeated performance on working memory tasks without adapting the difficulty level only results in faster reaction times but shows no increase in working memory capacity (Kristofferson, 1972; Phillips & Nettelbeck, 1984). As improvements are based on repetition, feedback and gradual adjustment of the difficulty, this training is called implicit training (Klingberg, 2010). It differs from explicit training which refers to the teaching of conscious strategies such as rehearsal (Butterfield et al., 1973), chunking and metacognitive strategies (Abikoff & Gittelman, 1985) for handling material in order to improve performance in working memory tasks.

Working memory training studies tend to adopt an intense and systematic schedule of training, e.g. Cogmed is administered for 30–45 min at least five times a week for 5 continuous weeks. Such scheduling can be considered as massed practice, which contains short, frequent and concentrated learning or practice sessions with shorter break times in between sessions. This is opposed to distributed practice which is characterised by extended and less frequent learning sessions with longer periods of rest in between sessions. The effects of massed versus distributed practice have been extensively investigated, especially on acquisition and retention (Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006; Dempster, 1988; Donovan & Radosevich, 1999). Evidence of distributed practice's superior effect on retention has been shown in basic verbal memory tasks such as list recall, paired associates and paragraph recall (Janiszewski, Noel, & Sawyer, 2003). A recent study on motor skills found that the impact of frequency of practice differs depending on the tasks on hand (Hosseini, Asgari, Rostamkhani, & Asghari, 2011). For the acquisition and retention of the same motions on tasks that has no specific beginning and end (e.g. mirror tracing), distributed practice was found to be more effective than massed practice. However, both massed and distributed practice was found to be as effective for the acquisition and retention of a motion that takes little time and can be identified with a beginning and an end (e.g. turning on the light).

Although most studies found the superiority of distributed practice over massed, working memory training programmes which are conducted on an intensive and massed manner seem to improve not only working memory but also other cognitive abilities such as intelligence (e.g. Jaeggi et al., 2008; Klingberg et al., 2002, 2005).

How the effectiveness of working memory training may be influenced by its variance in schedule has yet to be examined. There is one important difference regarding the training material used in previous studies looking at massed versus distributed practice and working memory training. In working memory training, the training material or stimuli are not the actual content that is tested in the criterion measures, though they may be very similar, whereas in verbal recall studies, for example, paragraphs or items on a list are learnt in a mass or distributed manner, and the recall of the exact contents from the paragraphs or list items is tested as the criterion measure.

Rationale for Current Investigation

A meta-analysis by Melby-Lervåg and Hulme (2013) showed that working memory training might not be as effective as once thought to be. A number of recent studies have failed to replicate earlier findings of facilitation (Chooi & Thompson, 2012; Redick et al., 2013; Thompson et al., 2013). Some researchers have questioned the efficacy of existing working memory or updating training programmes (e.g. Gibson, Gondoli, Johnson, Steeger, & Morrissey, 2012; Klingberg, 2012; Shipstead, Hicks, & Engle, 2012a; Shipstead, Redick, & Engle, 2012b). Given these inconsistent findings, it is not only important to examine the efficacy of the working memory training regime but also to investigate whether efficacy is influenced by training schedule.

In these two studies, we targeted the updating component rather than working memory per se in our intervention. Four intervention games were designed based on two commonly used updating paradigms instead of following *n*-back based programmes because from our previous experience, children in our target age group of 6–7 years may have difficulty understanding the task. Two games were based on the running span paradigm (Morris & Jones, 1990) where participants had to recall a specified number of items that appeared at the end of a sequence of items, and two games were based on the keep track paradigm (Yntema, 1963) where participants had to recall the last item of a specified number of categories. In all games, the number of stimuli increased adaptively from one to four. The participants were unaware of the total number of items in each sequence. As such, the updating needed to occur in order for the stimuli to be recalled correctly. A suite of corresponding games without the updating and recall components was also created for this study's active control group which would allow us to directly examine whether any intervention effects were merely due to practice in using the computer or playing computer games or to the updating component of the games.

As early intervention is important, we targeted children in their 1st year of formal schooling. Participants in the two studies reported here were typically developing children identified as having difficulties in mathematics via school assessments or by their teachers. Most were enrolled in the LSM in their schools. Previous studies have suggested that children with poor mathematics performance were more likely to have working memory difficulties, so working memory intervention may be particularly useful in helping them level up. These children also usually continue to

struggle in the school system, despite receiving supplementary lessons. If their working memory capacity is improved at a young age, it might lead to better performance in school later on. Furthermore, Holmes, Dunning and Gathercole (2011) found that children with impaired working memory benefited more from working memory training than those with less impaired working memory.

Study 1

To investigate the impact of working memory interventions, we examined in this study what effects a computer-administered working memory intervention programme has on performance on math and intelligence tests amongst children in the LSM programme. The aim of this study was to investigate both near (i.e. improved working memory task performance)- and far (i.e. improved mathematical performance)-transfer effects of our updating intervention programme. Given the many findings of strong correlations between working memory, updating and children's mathematical performance (e.g. Lee, Ng, & Ng, 2009; Lee et al., 2012; St Clair-Thompson & Gathercole, 2006), we expected that children who attended the intervention programme would improve not only their performance on the updating and working memory tasks but also performances on intelligence and mathematics measures to a greater extent than children in the control groups.

Method

Participants and Design

Participants were 70 children (mean age = 81.4 months; *SD* = 3.5 months; 42 boys) from 7 primary schools. All the children were either enrolled in the Learning Support for Mathematics programme or were nominated by their teachers as being poor in math. The children were split into three groups based on their pre-test math scores. Those who scored higher than a raw score of 15 on the Numerical Operations subtest from the Wechsler Individual Achievement Test – Third Edition (WIAT-III, Wechsler, 2009) were randomly and equally divided amongst the groups, while the rest were randomly divided. We chose this cut-off score because the majority of the normally achieving children in our longitudinal study scored 15 or below. The intervention group (*n* = 25) and the active control group (*n* = 24) attended the same sessions while the passive control group (*n* = 21) continued with their usual activities during the training sessions. This study was based on a 3 (group: intervention, active control and passive control) by 2 (time of test: pre-test and post-test) split-plot design.

Materials and Procedure

All children completed measures of working memory, mathematical proficiency and intelligence before and immediately after the intervention programme. The children in the intervention and active control groups were scheduled to complete twenty 30-minute sessions on average twice a week over a 10-week period. The passive control group continued with their usual activities during the intervention period and had no contact with the researchers.

Memory and Updating Tasks

The Pictorial Updating task was based on the running span task by Pollack, Johnson and Knaft (1959, as cited in Morris & Jones, 1990, p. 113). The children were shown a series of animal pictures one at a time on a computer screen and asked to recall the last two, three or four animals at the end of each trial. To ensure that updating was being used in the task, the children were unaware of how many animals were going to be presented. The number of animals presented varied randomly from 3 to 11 across 12 trials per span. The children began the task by recalling the last two animals, which then increased to the last three and then four. Each block contained 12 experimental trials. One point was awarded for every animal recalled accurately in the correct order (maximum: 108).

Four tasks (Listening Recall, Backward Digit Recall, Block Recall and Forward Digit Recall) from the Working Memory Test Battery for Children (WMTB-C) (Pickering & Gathercole, 2001) were administered according to published instructions. In the *Listening Recall* task, the children listened to a series of sentences read aloud by the researcher and were asked whether each sentence was true or false and also to recall the last word of each sentence in the correct order. The task progressed from spans one to six (with each span consisting of six sentences). Each correctly recalled word scored one point (maximum: 36). In the *Backward Digit Recall* task, the children were read a sequence of digits and were asked to recall the sequence in reversed order. There were six trials in each span that ranged from two to seven. Each correctly recalled sequence of digits scored one point (maximum: 36). The *Forward Digit Recall* task followed similar procedure with the exception that the children were asked to recall the sequence of numbers in the order they were read. Span length ranged from one to nine (maximum: 54). In the *Block Recall* task, the researcher tapped out a sequence on nine randomly positioned blocks at a rate of one tap per second. The children were asked to recall the sequence in order. There were six trials in each span, which ranged from one to nine. Each correctly recalled sequence was given one point (maximum: 54).

Intelligence Tasks

The Vocabulary and Block Design subtests from the Wechsler Intelligence Scale for Children – Third Edition (Wechsler, 1991) were administered and scored according to the published administration procedures as abbreviated measures of crystallised and performance intelligence, respectively. In the Vocabulary subtest, the children were asked to give the definitions of verbally presented words. In the Block Design subtest, the children were shown and were asked to reproduce designs by arranging up to nine blocks with different coloured sides. Each attempt was timed and scores were given based on this.

Mathematical Proficiency Tasks

We measured mathematical proficiency using four subtests from the WIAT-III (Wechsler, 2009). In the Numerical Operations subtest, children were administered written computational problems, which assessed their ability to identify and write numbers and count and solve math problems of increasing difficulty. One point was given for every correct response. The Math Problem Solving subtest consisted of visually cued questions administered verbally to assess children's ability to reason mathematically. Questions included word problems, measurement, time, counting, probability and statistics. In the Addition and Subtraction Math Fluency subtests, the children had to solve as many equations as they could out of 48 equations in 1 min.

Language Proficiency Tasks

Two language measures were administered to control for English proficiency. In the Schonell Graded Word Reading Test ("Schonell") (Schonell, 1942), the children were shown 100 words of increasing difficulty and asked to read as many as they could. The Bilingual Language Assessment Battery (2nd revision; BLAB-2) tested children's receptive vocabulary (Rickard Liow & Sze, 2008). The children heard a spoken word and had to select one out of four pictures on a computer screen which the word described. The task consisted of a set of 100 words and pictures ordered in increasing difficulty.

Working Memory Intervention Programme

The intervention programme consisted of four computerised games. Two games were based on the running span task where the children were asked to recall a specified number of items that appeared at the end of a sequence of items. Figure 11.1 shows

Fig. 11.1 Screenshots of the Post Bear game

screenshots of one of these games. The other two games were based on the keep track task where the children had to recall the last exemplar of a specified number of categories. In all four games, children were not aware of how many items would appear in the sequence and thus had to update their memory contents constantly.

Each game started off with only gameplay and no updating training element to provide some context to the game to make it more interesting to children. In the Post Bear game for example, the children helped the Post Bear deliver mail and moved him to avoid contact with the alien inhabitants. Each game consisted of four levels which corresponded to the spans used in updating assessment, i.e. number of items or categories the children needed to recall. All games were adaptive and all children started at level one, in which they only had to remember the last exemplar in a sequence or the last exemplar from one category. So at level one in the Post Bear game, the children were asked to remember the last alien encountered by the Post Bear. To progress to each subsequent level, they needed to have accurate recollection in four out of six trials in the preceding level. If they were unable to achieve this, they were required to play 36 trials at a particular level before they could move on to the subsequent level. At the start of the intervention programme, the children could only play 1 game at a time, and to unlock a new game, they had to reach level 3 or play at least 36 trials at levels 1 and 2. Once they had unlocked all games and satisfied one of the above criteria in all games, they could choose to play any game for the rest of the programme.

The games played by the active control group were similar to those played by the experimental group but without the updating and recall component. The background scenery or items in the games changed as they progressed. To unlock new games at the start of the programme, the children were required to play each game for at least 10 min before they could unlock the next game. They were also required to complete a total of at least 30 min of game play for each game during the intervention period. The children in the intervention and active control groups attended the same sessions during the training period.

Results and Discussion

The data were screened before analysis, and three univariate outliers from three different participants were replaced by values 3 *SD* from the mean. Data of one participant from the passive control group were deemed to be outliers and were excluded from further analyses. Two participants from the passive control group dropped out of the study before the post-test, hence their data was excluded from all analyses. Due to poor compliance and logistical constraints imposed by the schools, attendance varied from 3 to 20 sessions over a period of 39–93 days instead of the intended schedule of 20 sessions twice a week over a 10-week period.

Table 11.1 shows the descriptive statistics. A split-plot 3 (group: intervention, active control, passive control) x 2 (time: pre-test, post-test) MANCOVA performed on the data showed no significant interaction effects and no significant main effects of grouping. Null findings are always difficult to interpret but we hypothesised that one possible reason for the lack of training effects is that the intervention schedule was too distributed and not as intensive and massed as previous working memory intervention studies that have found positive training effects (e.g. Jaeggi et al., 2008; Klingberg et al., 2002, 2005). This schedule became distributed unintentionally because of constraints imposed by the school, so we could only schedule on average

Table 11.1 Means and standard deviations (in parentheses) of the outcome measures

Task	Intervention		Active control		Passive control	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Pictorial Updating	47.12 (12.71)	55.64 (10.20)	47.92 (15.34)	49.25 (16.99)	51.05 (19.50)	54.81 (14.06)
Listening Recall	6.28 (2.61)	7.52 (2.567)	4.54 (3.41)	6.67 (2.57)	5.81 (3.93)	8.62 (3.04)
Backward Digit Recall	8.38 (2.34)	9.36 (3.01)	8.08 (4.20)	10.25 (3.45)	8.95 (4.20)	11.00 (3.87)
Block Recall	22.24 (5.00)	22.08 (4.723)	21.38 (3.90)	20.96 (4.52)	21.86 (3.68)	22.52 (3.37)
Digit Recall	26.60 (4.31)	28.85 (6.65)	25.38 (4.54)	27.75 (4.87)	25.95 (4.96)	27.95 (5.59)
Numerical Operations	13.52 (2.87)	17.58 (2.80)	12.71 (4.39)	16.89 (4.12)	14.38 (3.37)	18.52 (4.46)
Math Problem Solving	27.72 (3.84)	30.92 (3.81)	26.13 (4.45)	30.78 (4.84)	29.00 (4.52)	31.38 (5.11)
Fluency – Addition	8.84 (5.81)	13.00 (5.32)	7.75 (6.60)	13.35 (6.58)	7.81 (6.03)	13.38 (6.45)
Fluency – Subtraction	4.16 (3.02)	8.25 (4.50)	4.42 (5.69)	8.61 (4.58)	3.76 (4.39)	8.48 (4.09)
Block Design	12.60 (8.49)	19.76 (9.58)	16.42 (10.07)	21.39 (11.88)	18.00 (11.64)	24.10 (10.43)
Vocabulary	6.72 (4.112)	7.80 (4.35)	5.42 (4.28)	7.13 (4.96)	7.52 (4.86)	7.57 (3.97)

Scores in the table are raw scores

two training sessions per week. This schedule was made more distributed by poor compliance; a number of the children failed to attend all the training sessions that were scheduled for the week. However, in the learning literature, it is commonly found that distributed practice produces better learning than massed practice. Our second study sought to clarify if the effectiveness of working memory training is influenced by variance in administration schedule.

Study 2

The second study examined the effect of massed versus distributed practice on the transfer effects of updating training using the same set of games. Although the learning literature has championed the use of distributed over massed practice on various learning platforms, many of these studies looked at learning concrete skills or crystallised knowledge such as a second language or vocabulary. Therefore, findings from this literature may not be generalisable to that of working memory intervention studies. Cognitive training is based on the theory of neuroplasticity, and intensive training has been shown to produce synaptic changes in the cortex, which translates to improved performance in various functions. Cognitive training targets domain-general processes and does not seek to only improve performance on the training tasks or tasks closely related to the training tasks but also produce flow-on effects, improving performance on other higher cognitive functions. Most studies on cognitive training have found that working memory capacity may be increased through intensive and adaptive training. Hence, it was hypothesised that the group trained according to an intensive schedule (i.e. massed group) would perform better on measures of working memory, mathematical ability and intelligence than the group trained according to a less intensive schedule (i.e. distributed group).

Method

Participants and Design

The participants were 45 children (mean age = 82.3 months; *SD* = 13.5 months; 27 boys) from 8 primary schools. The intervention group from Study 1 provided the data for the distributed group (*n* = 25), and 12 participants from Study 1's passive control group and 8 newly recruited participants were assigned to the massed group (*n* = 20). All participants in the Study 1's passive control group were invited to participate in this second study conducted approximately a year after Study 1 because there was insufficient number of new recruits to form the massed group. This study was based on a 2 (intervention schedule: massed vs. distributed group) x 2 (time: pre-test vs. post-test) split-plot design.

Materials and Procedure

All measures and procedures that were used in Study 1 were also used in Study 2. The massed group were administered the same amount of training as the distributed group but within a shorter time frame – five times a week for 4 weeks.

Results and Discussion

To control for age effects, participants' raw scores were converted to standard scaled scores where possible. Table 11.2 shows the descriptive statistics. A series of preliminary analyses was conducted to ensure that Study 1's passive control group and the group of newly recruited participants forming the massed group were comparable so that their data could be combined and analysed as a group because they had been recruited and tested at different times. No maturation effects were found for Study 1's passive control group so their post-test scores from Study 1 were used as Study 2's pre-test scores. There were no differences in pre-test scores between Study 1's passive control group and the group of newly recruited participants, so merging these two groups to form Study 2's massed group would not impact the post-test scores.

A 2 (group: massed, distributed) x 2 (time: pre-test, post-test) MANOVA based on a split-plot design was conducted with the 11 dependent variables of working memory/updating, intelligence and mathematical ability. There was a significant overall interaction effect, $F(11,33) = 2.44$, $p = 0.02$. $\eta_p^2 =. 45$. Univariate tests

Table 11.2 Means and standard deviations (in parentheses) of outcome measures for the massed and distributed groups

	Massed		Distributed	
Tasks	Pre-test	Post-test	Pre-test	Post-test
Pictorial Updating	45.95 (16.81)	59.45 (13.92)	47.12 (12.71)	55.64 (10.20)
Listening Recall	88.70 (18.43)	90.20 (12.24)	85.76 (14.16)	88.64 (13.36)
Backward Digit Recall	92.90 (15.46)	89.80 (13.89)	88.52 (12.96)	89.28 (15.46)
Block Recall	96.50 (14.80)	102.30 (15.29)	98.28 (22.26)	92.88 (21.02)
Digit Recall	103.30 (20.67)	104.75 (21.02)	107.76 (18.53)	110.24 (32.22)
Numerical Operations	100.05 (14.16)	107.65 (15.55)	96.08 (10.46)	99.64 (23.14)
Math Problem Solving	85.05 (10.67)	88.85 (11.56)	89.76 (11.16)	88.00 (20.97)
Fluency – Addition	88.60 (13.45)	91.50 (11.78)	91.72 (14.07)	91.24 (21.26)
Fluency – Subtraction	94.60 (11.45)	97.20 (12.83)	93.40 (10.08)	94.36 (22.83)
Block Design	9.90 (2.93)	9.70 (3.74)	9.20 (3.14)	10.80 (3.175)
Vocabulary	3.65 (2.37)	5.20 (2.73)	4.36 (2.75)	4.40 (3.01)

The scaled scores for mathematical ability and working memory tasks (except for Pictorial Updating on which no scaled score is available) have a mean of 100 and standard deviation of 15. Block Design and Vocabulary have a mean of 10 and standard deviation of 3.

revealed significant interaction effects for Block Recall, $F(1,43) = 5.91$, $p = 0.02$, $\eta_p^2 = 0.12$; Block Design, $F(1,43) = 4.97$, $p = 0.03$, $\eta_p^2 = 0.10$; and Vocabulary, $F(1,43) = 4.10$, $p = 0.05$, $\eta_p^2 = 0.09$. Follow-up paired sample t-tests showed that there was a significant increase in Block Design score from pre-test to post-test for the distributed group but not the massed group, $t(24) = -3.34$, $p < 0.005$, whereas there were significant increases from pre-test to post-test in Block Recall scores, $t(19) = -2.45$, $p = 0.02$, and in Vocabulary scores, $t(19) = -2.55$, $p = 0.02$, for the massed group but not the distributed group. A one-way MANOVA found no significant differences between the massed and distributed groups at pre-test, suggesting that differences in performance at post-test can be attributed to the intervention.

Both massed and distributed practice schedules for the updating training programme produced far-transfer effects. Post-test performance on the performance intelligence task was significantly better than pre-test performance when training was done in a distributed manner, while performance on the crystallised intelligence task increased significantly from pre-test to post-test when the training had a massed practice schedule. The massed practice schedule also led to improved performance on the visuospatial working memory task at post-test compared to the distributed practice schedule. It is interesting to note that in Study 1 even though the intervention group is the same group of children forming the distributed group in Study 2, there were no transfer effects at all when compared to the other groups even when scaled scores were used. This could be because the massed group's performance on the task at post-test decreased slightly, magnifying the group differences.

General Discussion

This chapter looked at whether a novel updating intervention programme increased in working memory and updating capacity in Primary 1 children with mathematical difficulties and also if it was effective as a remediation strategy to improve the mathematical performance. In Study 1, the intervention programme was administered according to a distributed schedule and did not produce the expected near- and far-transfer effects. There were no significant differences in performance of the intervention and control groups on all the dependent measures. In Study 2, the group that underwent the intervention programme according to a massed schedule had better performance in visuospatial working memory and vocabulary than the group that underwent the programme according to a distributed schedule, while the finding was reversed for performance intelligence. There were no differences between the two groups in performance on the other tasks.

There are no previous studies as far as we are aware of that have administered working memory and updating training according to a similar distributed schedule, so it may be that such a schedule will reduce the effectiveness of such training. However, in Study 2, the group that was administered the training according to a distributed schedule did better on the intelligence task compared to the massed schedule group. In fact, the massed group's performance decreased slightly from

pre-test to post-test. This finding is not in line with some previous studies which found updating training improved fluid intelligence (e.g. Jaeggi et al., 2008, 2011).

One possible explanation to this is a concern that this training programme may not be sufficiently adaptive or participants were not training at their optimum capacity, which translated into mixed findings and a lack of transfer effects to mathematical performance. In each game, participants are allowed to progress to the next level after playing 36 trials in a level regardless of whether or not they are able to pass the level. Therefore playing at the higher level might not have been optimal if they could not even manage updating and recalling a lower span. The importance of adaptive training has been illustrated by Holmes et al. (2009). They found that the gain in performance on criterion measures was significantly greater for the group trained using the standard adaptive version of Cogmed than for the group trained using a non-adaptive version of the programme. Nonetheless, there were some transfer effects, so this explanation is unlikely.

A possible explanation for our findings in both studies is that our participants were essentially children without working memory deficits or their mathematical difficulties were poor only relative to their immediate peers. Because only a small number of schools were not involved in a government-led, nationwide study conducted on the same population, we had to include all the children who consented to participate regardless of whether they had normal or poor working memory capacities. Our pre-test results showed that our participants did not have working memory deficits when compared to participants from our longitudinal study who were assumed to have typically developing working memory capacity and normal academic performance. Many of them also performed relatively well on our standardised mathematical measures, indicating that generally as a group they may not have mathematical difficulties. An independent t-test comparing performance on the Numerical Operations subtest showed that the participants in Study 1 performed significantly better than a typically developing sample of the same age in our longitudinal study. It is noteworthy however that a study by Klingberg et al. (2002), for example, showed improvement from working memory training may occur even in the absence of initial deficit in working memory. The games in our intervention programme did not contain any obvious mathematical content, so future intervention programmes combining working memory or updating training with mathematical training may improve transfer of effects.

These children could have been performing poorly in class instead due to a poor understanding of classroom instructions and situations due to poor understanding of the English language or a lack of classroom skills or school experience. Many of the children in our sample had difficulties with the English language and were in the Learning Support for English programme for English as well. A number of them were also from recent immigrant and non-English speaking families and had difficulty understanding our researchers who administered the tasks and intervention instructions in English. Though English is the language of instruction in the school system here, the mother tongue or home language of many Singaporean children is not English. Instead it is normally the language of their ethnic groups or its dialect(s). Hence, exposure to the English language is likely limited for these children outside

of school. Anecdotal evidence also suggests some of the children did not attend pre-school or school regularly. Improvement in understanding the classroom situation may contribute to helping a child level up. Future studies could include objective measures of classroom behaviour. Previous studies have found improvement in classroom behaviour after working memory training (Bergman-Nutley & Klingberg, 2014; Holmes et al., 2009).

One limitation of both studies is that only immediate post-tests were administered, so if improvement in updating capacity and other training effects take time to develop, they might not immediately be detectable at the end of the intervention programme. This was the case in a study by Holmes et al. (2009) where the training had little impact on measures of academic skills immediately after training, but an improvement in mathematical reasoning scores was reported 6 months after training. However, because only the training group and not the control group was retested after 6 months, it is unclear whether this improvement can be attributed to the training.

Conclusion

Along with mapping the milestones of cognitive development and its influence on the acquisition of mathematical skills, a critical issue is how cognitive and academic competencies can be supported and developed amongst low-achieving children. Levelling up disadvantaged children is not an easy endeavour given the number of individual and environmental challenges that they need to overcome. Our studies have shown that our sample of LSM children did not seem to be disadvantaged when it came to working memory or mathematical ability, but they were still lacking in their demonstrated school mathematical performance. In addition, the nature of environmental variables is often difficult to change. This study reflects the potential of a targeted intervention that can be economical and accessible as well as possibly help these children overcome their deficits. Results from intervention studies such as this study can also inform teaching practices and enhance learning opportunities in learning support programmes.

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Chapter 12
Early Intervention of Malay Preschool Teachers in Promoting Children's Mathematics Learning

Pamela Sharpe and Sirene Lim

Introduction

The underperformance of Singaporean Malay children in mathematics, compared to their Chinese and Indian peers, is well documented. This is despite their above average international scores, reported in the 2003 Trends in International Mathematics and Science Study (TIMSS) where Malay children are ranked fifth, equal with Japan for mathematics (Teo, 2006). However, the reality is that these children do not compete on the international stage on a day-to-day basis but rather with children in their own schools and classrooms where relative failure can and does lead to underperformance. In the 10 years prior to 2009 when the study reported in this chapter was conducted, the pass rate for Malay children in mathematics in the Singapore Primary School Leaving Examination (PSLE) actually declined from 63.4% in 1999 to 56.3% in 2009 (The Straits Times, 2009). It is this relative underperformance that was a major concern for Yayasan MENDAKI[1] and the wider community. International research shows the importance of high-quality preschool mathematics education for subsequent mathematics development. No such research exists, however, for Malay preschool settings in Singapore, and this was the general research problem addressed by this study. This research, then, addressed an urgent problem of stakeholders. Its overriding concern was to provide these stakeholders with sound guidance on how to improve the quality of Singaporean Malay preschool

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[1] Yayasan MENDAKI is a self-help group set up by Malay/Muslim community leaders in Singapore in partnership with the government and dedicated to the empowerment of the disadvantaged in society through excellence in education.

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teachers' knowledge of children's developing numeracy skills in order to improve the numeracy performance of Singaporean Malay preschool children. The research was conducted solely with Malay children with no comparisons made with other ethnic groups. It was not possible to follow up the performance of the children in primary school, although the teachers of the experimental group children were consulted about the lasting effects of the intervention on their subsequent understanding of how children become numerate and their current teaching strategies for Kindergarten mathematics.

Specifically, this study sought actively to provide support for Kindergarten year 2 (K2) Malay children in their early mathematical learning (i.e. problem-solving, reasoning and numeracy) so as to maximise their readiness for optimal performance when they enter the lower primary school year. The 9-month intervention facilitated professional learning among a group of K2 Singapore-trained teachers: (a) in their understanding of how children think and learn as they become numerate; (b) to observe children's progress and select appropriate strategies, activities and materials to challenge children's numeracy and scaffold their learning; (c) to involve parents in practices of supporting their children's numeracy learning; and (d) to mentor the K2 Singapore-trained teachers in pedagogy and practice in K2 children's numeracy development and document classroom contexts, teachers' and children's learning, artefacts and parents' participation in their children's learning.

Mathematics Intervention for Preschool Children

It is well known from studies of babies and very young children that their mathematical development occurs as they seek out patterns, make connections and recognise relationships through playing with quantities and sets of items and objects. Such play leads to children knowing about numbers and counting, sorting and matching and understanding shape, space and measuring (Bryant, 1995; Durkin, 1993; Nunes & Bryant, 1996). Hence, becoming numerate involves thinking mathematically about problems and their solutions, using numbers to make connections and realising numerical relationships through real-life situations (Kamii, 1989; Young-Loveridge, 1989). This involves using and understanding a system of signs and symbols (Boulton-Lewis & Tait, 1994).

Research in the UK and the USA has shown that high-quality preschool education leads to positive effects for children, families and communities, particularly for minorities and disadvantaged groups (DfEE, 1998, 1999; Melhuish et al., 2008). The research underpinning the *Sure Start* initiative in the UK (Craig et al., 2007) shows that 2 years of high-quality early childhood education can give children a 4–6 months advantage at entry to school and improve the chances for academic success of children from at-risk or disadvantaged backgrounds. An American study has shown the positive effects on preschool children's later performance in mathematics once these children had been exposed to a research-based preschool mathematics programme called 'Building Blocks' (Clements & Sarama, 2008). The children in this study developed a firm mathematical foundation as a result of the

high-quality mathematics environment which constitutes 'Building Blocks'. Furthermore, Ginsburg, Joon and Stevenson-Boyd (2008) point out three essential elements of effective mathematics education for preschool children, namely, a belief that children are capable of learning more than is assumed; programmes must provide opportunities for informal play but be structured; high-quality teaching is required; and this requires urgent improvements in the initial and in-service training of preschool mathematics teachers.

It is noteworthy that, unlike the children in the *Sure Start* studies in the UK, where children begin formal schooling at 5 years of age, children in Singapore start formal schooling 2 years later than their British counterparts. In addition, because preschool education is not compulsory in Singapore, some children do not receive any schooling until they reach the age of 7. At the time when the study was conducted, many children who had preschool experiences were taught by teachers who had fewer than 5 'O' levels passes and generally held only certificates or diplomas of preschool teaching, the duration of which varied from 350 to 1500 h only. As such, the quality of education for preschool children in Singapore could be low, and children did not receive the best schooling at the point in their development when they were most receptive to numeracy learning that is between the ages of 5 and 7. In short, Singapore preschool children's experiences often inadequately prepare them for the demands of primary school. There have been wasted opportunities for children to develop numeracy readiness in the most formative years of their development (cf. DCSF, 2008; Munn, 1994).

To address these problems, a framework for a developmental kindergarten curriculum was developed in Singapore in 2003 and updated in 2012 (Ministry of Education, 2003b, 2012). A developmental approach to numeracy education stresses building on children's natural ways of representing their ideas about numbers, by guiding them on from perceptually-dominated experiences to thinking logically about numbers and their relationships (Kamii, 1989). The framework recognises that children need to be given opportunities to investigate, discover and apply their own solutions to mathematical problems (Sharpe, 2001, 2009). The mathematics component comprises a developmentally sequenced syllabus with lesson plans and teacher notes on implementation which stresses the importance of discovery learning, mathematical language, oral activities and teacher-pupil interaction. This curriculum was trialled on a small sample of K1 and K2 Singapore teachers before being made available by the Ministry of Education to all kindergartens and kindergarten classes. The effects of this curriculum on children's learning and development, especially in the domain of numeracy, were found to be very positive for those kindergartens taking part in the trial (Ministry of Education, 2003a). However, the decision as to whether the curriculum would be adopted by all kindergartens was left to the discretion of individual centres.

The present study built on some of the ideas and processes which had been shown to reap positive results in Singapore (Ministry of Education, 2003a). In particular, it focused on the important role of the preschool teacher in supporting and extending numeracy development in children to prepare them for the primary mathematics syllabus. Teachers need to provide sufficient time, space and encouragement for children to discover and use mathematical vocabulary and ideas

and to explore real-life problems (Munn, 2004; Young-Loveridge, Peters, & Carr, 1998). Although there is a dearth of published evidence as to the cause and extent of preschool mathematics learning difficulties in Singapore, it is envisaged that, with careful and sensitive teaching by competent and knowledgeable teachers, such deficits might be overcome so that the short falls in performance can be alleviated before these children begin formal schooling (cf. Aubrey, 1997; Kleinberg & Menmuir, 1995). The study described here is unique and significant in that it focuses on the early mathematical learning of Malay children in Singapore and explores how high-quality in-service training and in situ mentorship of teachers can enhance children's mathematical development and learning.

The awareness of the important role of the teacher in promoting numeracy development in young children has been recognised by MENDAKI Singapore, who has expressed concerns about the overall poor performance of Malay preschool children in mathematics and their subsequent poor performance in mathematics in primary school. Thus, in order to better prepare children in Singapore for the required content of the primary school mathematics syllabus, it is important to raise the standards of mathematics teaching in the kindergarten. Initially such an objective may be achieved only on a small scale through this preliminary research, but with time, the outcomes may have a positive and far-reaching effect. Hence, the aim of this study is to begin the process of early mathematical intervention, with the aim of MENDAKI sustaining the processes of this research on a larger scale, and to ultimately reach increasing numbers of kindergarten teachers and children in Singapore over time. Outcomes of this research have direct application to MENDAKI Singapore (the initiators of this research) and will lead to MENDAKI's further implementation of the teacher-improvement approach used in this study.

This study sought to answer the following research questions: (a) How successful is the intervention in helping to assist teachers and parents to understand key features of children's early mathematical learning? (b) Were teachers able to apply their previous and newly developed knowledge in relation to their pedagogical practices in order to support children's learning? (c) Were there observable gains in children's numeracy learning progress, in terms of scores on mathematics reasoning tests, researcher observations and parents' perspectives?

Research Methodology

Design

The research design involved intervention measures for the experimental group of teachers alone. The control group teachers received whatever professional development they would normally receive and served as a means for comparison. Among the documentation collected from the control group settings were the K2 numeracy syllabi. These showed that the control group children followed the same content as the experimental group children.

Participants

The research design comprised a sample of five experimental groups and five control groups of K2 Singaporean, Malay children ($N = 221$), their teachers and parents. Ten classrooms in nine schools were purposively sampled on the advice of MENDAKI, based on settings comprising Malay children only. Intact classes were matched to treatment and control conditions on the basis of MENDAKI selection and centre choice of participation. The ten teachers who took part were the class's regular teachers. Parental consent for their children's involvement in the study was acquired. In all, 35 interviews took place with either one or both parents. All of the teachers in the study had obtained or were in the process of obtaining their teaching diploma in early childhood care and education, DECCE-T, a programme ranging in duration from 350 to 1200 h depending on when the diploma was awarded. All the teachers had 5–10 years' experience in the field.

Intervention

A key feature of the intervention was that the kindergarten lessons would comprise whole class, small group and individualised teaching. Thus a typical lesson would begin with a whole class introduction, followed by small group activities, with concurrent attention to individual needs followed by individual involvement with activity sheets and/or learning corner activities. The experimental group children were divided into three different levels for differentiated teaching using data from the Numeracy Concept Test which is discussed later in this chapter. The intention was that children who had mastered a particular item would not be held back until their classmates caught up and slower children would be given an opportunity to catch up. It was envisaged that this grouping procedure would maximise the benefits of the intervention programme. Modifications were made to the experimental group teachers' selection of activities, style of teaching and teacher-child or teacher-group interactions in order to accommodate the various levels of children's understanding and number competence, which differed across the groups at each level. This was to maximise the effectiveness of the intervention programme.

The overall intention was to provide the experimental group teachers with knowledge about how to improve their teaching and classroom environment and to support them in implementing this knowledge so as to bring about improvements in their pupils' mathematical competence. This intervention was given at the beginning and throughout the research project. Following action research procedures, the researchers were thus involved in a dynamic, 'spiralling' process where observations of classroom settings were made on an on-going basis and formed part of the mentoring process. With these overarching principles, the resulting intervention consisted of three approaches: the provision of detailed lesson plans and materials; in-service teacher training from the consultant, mentor and co-principal investigator; and off-site mentorship from the mentor and consultant.

Provision of Detailed Sequential Lesson Plans and Materials

Lesson plans and materials were prepared and distributed to the experimental group teachers. There were seven sets of lesson plans and resources which were developed on an on-going basis, taking into account, for example, feedback from the mentor and teachers. The lessons were sequentially planned on the basis of the steps and strides of numeracy development described in 'the Kindergarten Curriculum Framework' (Ministry of Education, 2003b). The lesson plans also included advice for parents and differentiated activities for children at three different levels of children's ability, which were identified as the research progressed and which are discussed later in the chapter.

In-Service Teacher Training

Twenty-four hours of in-service training was provided for the experimental group teachers. Workshops were conducted on three full days in March, June and August 2009, consisting of lectures, discussions, workshop activities and the use of audio-visual materials. In order for them to become familiar with the content of the in-service training, the research assistants also attended the workshops. Prior to the intervention, the research assistants and mentor made site visits to the experimental and control group schools to familiarise themselves with the kindergartens, principals, teachers, children, parents and the school/classroom contexts of their assigned groups. In addition, they collected consent forms from the participants indicating their willingness to be involved in the project.

Mentorship (Onsite and Offsite)

The mentor made a total of 21 site visits in all to the experimental group settings. The purpose of the visits was to coach the teachers in using the lesson plans and materials, as well as devising appropriate classroom settings. Additionally, the mentor kept field notes of her perceptions of the teachers' progress and the issues raised by the teachers.

Data Collection

In this study both quantitative and qualitative methods were used to monitor the success of the 9-month intervention. These were observations of teachers and pupils; semi-structured and focus group interviews with teachers; teachers' questionnaires; documentation of children's learning in the K2 classes; testing of children's problem-solving, reasoning and numeracy knowledge and skills; and documentation of K2 school contextual factors and interviews with parents. Data was analysed both quantitatively and qualitatively to track teacher success in

assisting K2 children's numeracy development/learning and children's numeracy-based progress throughout the intervention period.

The research assistants and mentor were trained in establishing a standard set of procedures for administering the tasks, collecting the data and scoring the results. Raw scores were compared for the pre- and post-test results for children in each of the three groups (1, 2 or 3) to measure levels of improvement before and after the intervention. In addition to raw scores, verbatim records of children's gestures and comments were also recorded to supplement the quantitative data. At the end of the intervention, the children's grouping levels were reassessed.

Instruments

Teacher Observation Scale

A Teacher Observation Scale was constructed to track the progress of the experimental group teachers in implementing the knowledge and skills covered in the workshops. The instrument comprised items that allowed comparisons to be made between the experimental and control group teachers and classrooms. This Teacher Observation Scale had been designed previously to collect data for, 'the Kindergarten Curriculum Framework' (Ministry of Education, 2003b). It was used in this research, as it had been in the 2003 study, to assess the physical, social and psychological environment; scaffolding techniques involving questions, prompts and demonstrations; teacher competence especially in relation to eliciting appropriate responses; the use of mathematical language; provision of appropriate materials and resources; opportunities for recall and application of taught concepts and elicited ideas; formative assessment in the form of time; and assistance and opportunities for children to apply and practice previously learnt knowledge and skills. The Teacher Observation Scale (TOS) was used to collect data on the experimental and control group settings. Individual raters scored each item from 1 (poor) to 4 (very good). Tests of inter-rater reliability between the two raters were carried out. Average ratings were calculated for each item and setting.

Wechsler Individual Achievement Test (WIAT-II)

The (WIAT-II) Wechsler Individual Achievement (Test 2) math reasoning subtest was administered to both the experimental and control group children at the start and end of the intervention period. This instrument is widely used for diagnostic purposes and, although standardised only in the USA and UK, it seemed a good choice for measuring the sample groups' progress in simple numerical operations such as counting, addition and subtraction and mathematical reasoning in solving simple word problems in relation to pictures. The test, which took approximately 10 min to administer, was conducted according to test guidelines by trained external testers.

Numeracy Concepts Task Test

To test for treatment effects, a more detailed and appropriate mathematics test was required. It was decided to use the 'Numeracy Concept Test', which is a test that had been devised and used in a previous study (Sharpe, 2002). It was also administered to both the experimental and control group children at the start and end of the intervention period. The Numeracy Concept Test included items on counting, addition and subtraction, counting on from a set, knowing 'how many more' and 'how many less', pairing, 'bigger than', 'smaller than', 'number order' and addition and subtraction word problems. Each item was scored either right (1) or wrong (2). For the first analysis, the first 17 items in the test were used. In the post-test, however, items 1–6 were not used, and further six items (test items 18–23 – value of coins) were added. Thus the post-test comprised 17 items. For the second analysis, only items 7–17 from the pre- and post-tests were used. Items 1–6 were excluded because they were simple counting tasks that most of the children were able to do at the start of the intervention. They were included in the first pre-test analysis to provide information to help the researchers allocate children to each of the three intervention group levels. Items 18–23 were left out of this analysis because the coin tasks had only recently been introduced to the children when the testing took place and only one centre – PPIS – had adequately covered them. Accordingly, it was felt that a comparison of pre- and post- test scores on items 7–17 would provide a more valid comparison.

Results

The WIAT-II Test

Findings from the WIAT (math reasoning subtest of Wechsler Individual Achievement Test 2) and the NCT (Numeracy Concept Test) were subjected to analysis of variance, ANOVA. Repeated measures of ANOVA were selected to be used to analyse the data. The between-subject factor is termed GROUP, and the within-subject factor is termed TIME (PRE-TEST and POST-TEST). Separate ANOVAs were conducted for dependent variables scores on the WIAT and NCT.

On the WIAT scores, there was a significant TIME main effect, $F(1,218) = 323.93$, $p < 0.01$, $\eta^2 = 0.60$. This means that the mean score on the WIAT for all the children was different at pre-test and at post-test. Overall, children scored better on the WIAT on post-test than on pre-test. The effect was a large one as shown by the partial eta square estimate of 0.6.

The main effect of GROUP was also significant, $F(1,218) = 6.31$, $p < 0.01$, $\eta^2 = 0.03$. The experimental group consistently scored better than the control group at both pre-test and post-test.

The TIME x GROUP interaction was not significant, $F(1,218) = 0.67$, $p = 0.41$, $\eta^2 = 0.00$. In other words, the experimental and control groups did not differ in their performance at the pre-test and post-test. No experimental effect was found.

The Numeracy Concept Test

Two tests were conducted on the Numeracy Concept Test data, each analysed by repeated measures of ANOVA.

Numeracy Concept Test 1

On the NCT scores, there was a significant TIME main effect, $F(1,218) = 239.89$, $p < 0.01$, $\eta^2 = 0.52$. This means that the mean score on the NCT for all the children was different at pre-test and at post-test. The children scored better at pre-test than at post-test.

The main effect of GROUP was also significant, $F(1,218) = 32.69$, $p < 0.01$, $\eta^2 = 0.13$. Overall, the experimental group performed better than the control group on the NCT.

The TIME x GROUP interaction was also significant, $F(1,218) = 0.214.12$, $p < 0.01$, $\eta^2 = 0.50$. In other words, the experimental and control groups differed in their performance at the pre-test and post-test. This interaction was due to the experimental group maintaining its performance at pre-test and post-test, whilst the control group performed worse from pre-test to post-test.

Two main explanations seemed possible for these surprising results. The first likely explanation concerned the inclusion of the simple counting tasks (items 1–6) in the pre-test and their exclusion from the post-test. The second likely explanation was the inclusion of difficult 'value of coins' items in the post-test. Taken together it seemed likely that they introduced a threat to the internal validity of the experiment. In order to shed more light on these findings and to correct for this problem, procedures were standardised so as to use the same test items in both pre- and post-tests. An additional ANOVA was conducted to compare the experimental and control group results with only items 7–17 which were items that tested material taught over the intervention period.

Numeracy Concept Test 2

The results show that there was a significant TIME main effect, $F(1,218) = 381$, $p < 0.01$, $\eta^2 = 0.64$. This means that the mean score on the NCT for all the children was different at pre-test and at post-test. Overall, the children scored better at post-test than pre-test.

The main effect of GROUP was also significant, $F(1,218) = 31.70$, $p < 0.01$, $\eta^2 = 0.13$. Overall, the experimental group performed better than the control group on the NCT.

Importantly, the TIME x GROUP interaction was significant, $F(1,218) = 190$, $p < 0.01$, $\eta^2 = 0.47$. In other words, the experimental and control groups differed in their performance at the pre-test and post-test. The experimental group scored significantly higher at post-test than pre-test.
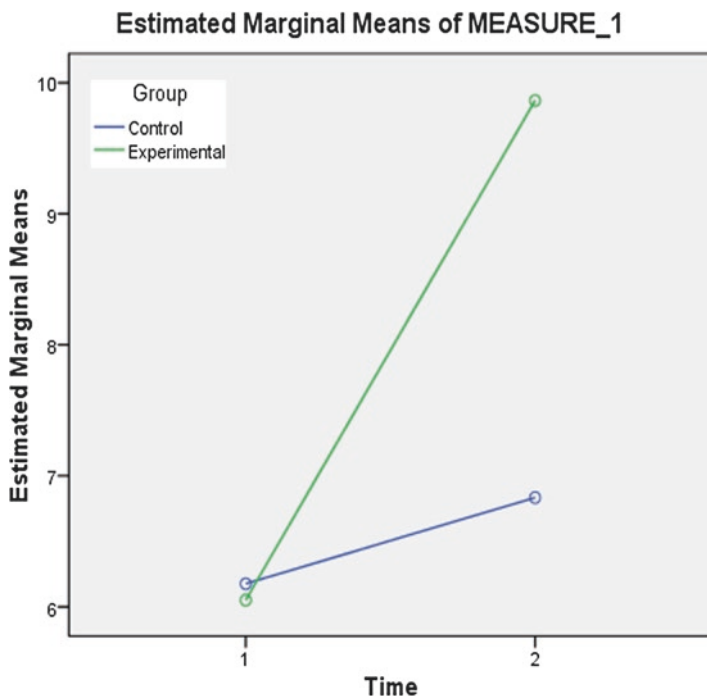
Fig. 12.1 Difference in scores for the experimental and control groups at pre- and post-test

Figure 12.1 shows the differences in scores for the experimental and control groups at pre- and post-test.

Changes in Experimental Group Levels from Pre-test to Post-test

It will be recalled that at the start of the intervention, the experimental group children were allocated to one of three different levels for group work activities. The following two tables address the question of how the intervention impacted on these different levels. The key question is, at the end of the intervention, how many pupils could be said to have been 'promoted' from one level to another, how many 'demoted' and how many stayed the same?

Table 12.1 uses data from the first Numeracy Concept Test analysis which included the more difficult 'value of coins' items. It shows that 41 of the experimental group children moved up a level with 9 remaining at level 1. Hence 50 children appear to have benefitted from the intervention. Twenty-five children either remained at level 1 or moved up to level 1. Of these 25, 14 moved up from level 2 and 2 from level 3, having successfully completed the coin tasks.

Table 12.1 Changes to within group performance levels of EG children: numeracy concept test analysis 1

Settings	Al-Is	Assy	DM	JN	PPIS	Total	Sub-total
Total tested	24	17	36	11	31	119	
Up L2 to L1	3	1	3		7	14	41
Up L3 to L1		1			1	2	
Up L3 to L2	2	7	11	1	4	25	
Remained at L1	2	2	4		1	9	68
Remained at L2	10	3	9	6	16	44	
Remained at L3	4		6	4	1	15	
Fell L1 to L2		3	3		1	7	10
Fell L2 to L3	3					3	

Table 12.2 Changes to within group performance levels of EG children: numeracy concept test analysis 2

Setting	Al-Is	Assy	DM	JN	PPIS	Total	Sub-total
Total tested	24	17	36	11	31	119	
Up L2 to L1	12	4	9	5	23	53	84
Up L3 to L1	1	6	8	1	5	21	
Up L3 to L2	4	2	4			10	
Remained at L1	1	5	7		2	15	33
Remained at L2	3		3	1		7	
Remained at L3	1		5	4	1	11	
Fell L2 to L3	2						2

Table 12.2 uses data from the second Numeracy Concept Test analysis. It shows that 84 out of the 119 experimental group children moved up a level and 15 children remained at level 1 (there was no other level to move to and they didn't move down). Of the children who were 'promoted', 21 of them had jumped from level 3 to level 1.

The Teacher Observation Scale (TOS)

The Teacher Observation Scale provided data to help address the question of whether the experimental group teachers were able to apply their previous and newly developed knowledge in relation to their pedagogical practices in order to support children's learning. The average ratings from the Teacher Observation Scale for the experimental group settings are summarised below:

- PPIS was rated 3 and 4 on all measures.
- Assy was rated mostly 3 with two domains rated at 2 (assistance to individuals at free choice activities and challenges and opportunities to work independently).

- Al-Is rated 3 on all measures but one (monitoring children in large and small group activities).
- JN received ratings of 3 on two thirds of the domains but rated 2 on the other third of the domains (the centre scored better on whole class teaching).
- DM was mostly 3 except for assisting with free choice activities and posing appropriate questions where it was rated at 2.

The average ratings from the Teacher Observation Scale for the control group settings is summarised below:

- DS – (Two teachers) was mostly rated at 3 but there were some ratings of 2 for explanations, arousing and maintaining attention, furniture for easy access, monitoring of group work and using inappropriate materials.
- An-N – was rated 3 on all domains.
- Al-A – mostly 3 except for provision for displays and resources and monitoring of free choice activities.
- HS – mostly 2 for all measures except child interactions and use of space.

These two sets of ratings from the TOS data give some support to the question of whether the training received by the experimental teachers had been translated into changes in their teaching and learning environments. Data collected during the individual teacher interviews and the focus group meetings (but not reported in this chapter), however, casts further light on this.

Summary and Discussion

The study reported in this chapter has found that the provision of a high-quality preschool mathematics intervention programme for Singaporean Malay preschool children had positive outcomes for the children and their teachers.

There were clear differences in gains in mathematical reasoning over the course of the intervention period between the experimental group and the control group children. The experimental group children performed significantly better overall on the Numeracy Concept Test than the control group children, and many of them moved upwards from their group levels. However, these gains were not apparent on the WIAT-II test. Possible reasons for this lie in the nature of the test items and the test procedures. The test does not use manipulatives, and testers are instructed to stop the test if children fail to answer six consecutive questions. Unexpected results were obtained from the first Numeracy Concept Test analysis where the pupils' apparent regression appeared to have been the result of differences in the items used at pre- and post-tests which had introduced threats to the internal validity of the experiment. The second Numeracy Concept Test analysis, however, did produce clear differences, though the issue of standardisation needs addressing before the results can be confidently accepted as valid. Whilst the WIAT-II test has been standardised on US and UK populations, to the best of the authors' knowledge, it

has not been standardised on Singaporean or more generally, Asian populations. The Numeracy Concept Test, though having been used by the author before in studies of Singaporean preschool children, has also not been standardised on the Singaporean preschool population. Therefore, in order to assess whether the gains of the experimental group were real and meaningful, it is necessary also to take into account other data presented in the study. Taken together with this other data, the authors are confident that the Numeracy Concept Test did provide an accurate measure of the real gains that were made. Standardisation of the Numeracy Concept Test, however, is a recommended step for future researchers.

The Teacher Observation Scale proved disappointing. Analysis of the research assistants' ratings showed a preference of the raters for mid-point ratings. Many will recognise this as common among raters, and arguably it is a cultural preference of Singaporean raters. This tendency was no doubt exacerbated by the provision of only four points on the rating scale which considerably reduced its power of discrimination. Were this instrument to be used again, the scale would need to provide more response options. Ideally, there would have been more opportunities for comparing the experimental and control group settings.

Taken together, it is the belief of the researchers that the training programme had produced changes in the attitudes and practices of the experimental group teachers, and these had impacted on the practices of the experimental group children, in turn producing improvements in their mathematical reasoning scores. The findings of the research show that improving the knowledge and practices of Singaporean preschool teachers can improve the mathematical reasoning scores of Singaporean preschool children or, more accurately, Singaporean Malay preschool children. Ginsburg et al. (2008) have highlighted the importance of knowledgeable and skilful mathematics teachers for preschools and argued that pre- and in-service training needs to be improved. In Britain, the 'Williams Report' (DCSF, 2008) also stresses the need for better qualified and knowledgeable teachers in early years settings to give children a better start before they begin formal schooling. It stresses that children should be competent in the foundations of mathematics by the age of 7 years. This, it will be recalled, is the age at which many Singaporean children start formal schooling. The Williams Report, in a line of reports stretching back to Plowden, also emphasises the important role of parents in preschool education. One of the disappointments of the authors is that they have been unable to find evidence of strong Malay parental support, the lack of which in Singapore is a constant theme of MENDAKI.

Implications

Producing improvements even on such a small scale as this research project has done is encouraging. They exemplify Ginsburg's view, outlined at the beginning of this report, that the three essential elements of effective preschool mathematics education are belief in children, structured, playful programmes and high-quality

teaching. However, rolling out a programme such as this across the Singaporean Malay preschool system has its difficulties. It seems pertinent, then, to end, on both an encouraging and cautionary note. What needs to be done? The list below is hopefully a starting point:

1. Reconsider the time allocated to numeracy teaching in preschool, and have mathematics everyday as a core subject area and not linked to themes.
2. Have a lead teacher with good content knowledge of children's early numeracy development and learning needs, and provide regular support and in-service courses for teachers.
3. Work with the Early Childhood Development Agency (ECDA), and have more time allocated to mathematics in initial teacher training, and separate this training from the science component with which it is currently joined with combined hours.
4. Provide a syllabus based on the 'steps and strides' in numeracy development and the lesson plans which have formed the basis of the intervention programme and which stresses oral activities, hands-on manipulatives, check questioning and the constant use of mathematical language.
5. Provide for numeracy lessons in three parts: an introduction with recall of previously learned concepts, a development of the concepts with small group activities and independent activities at learning corners for reinforcement and practice.
6. Provide activity sheets for reinforcement. These should not be the basis of the lessons.
7. Provide for differentiation at ability groups with frequent opportunities for children to change groups according to progress.
8. Have learning corners linked to concepts and not to themes, and include activities which reflect previously taught concepts and activities which extend and challenge children.
9. Improve management support so that time for teaching, support for learning and improved provision for resources and materials are paramount.
10. Instigate a system of networking between settings, similar to the cluster system for primary schools.

In relation to points 3–5 above, a number of recent initiatives concerning improvements in initial and in-service preschool teacher training have taken place in Singapore, one of which was the formation of the Early Childhood Development Agency in April 2013. The ECDA is a government statutory board created with the aim of improving the quality of early childhood care and education by harmonising two previously segregated sectors of kindergarten and childcare. Since its formation, the ECDA has announced the government's pledge to spend $30 million in the next 3 years towards early childhood educators' professional development (ECDA, 2013), mainly through the integration of diploma, degree and master's training bursaries and scholarships that were previously offered separately by the Ministry of Education (to kindergarten teachers) or the Ministry of Social and Family Development (to childcare teachers). Beyond these bursaries and scholarships, the

ECDA continues to be the governing body accrediting early childhood diploma qualifications. However, there is still a need for an authoritative body to review the training content of all existing early childhood diploma and degree programmes to ensure sufficient depth of coverage in the area of numeracy concepts and teaching strategies. It is also possibly misleading for the field that the most recently revised Kindergarten Curriculum Framework launched in 2013 contains a significantly reduced list of learning goals for numeracy (Ministry of Education, 2012). With a shortened list of learning goals for this learning area, a growing concern among the public about children's transition from kindergarten to primary school and a continued lack of training opportunities to better understand young children's development of mathematical thinking, teachers may be left to their own devices to design a play-based curriculum that would honour children's holistic development.

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