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*by*

**Yong Yik Wei, Aekapol Chongvilaivan,  
and Chew Jing Yang**

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# Alternative Approaches to the Development of Early Childhood Education in Singapore

YONG YIK WEI, AEKAPOL CHONGVILAIVAN, AND CHEW JING YANG\*

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## Abstract

A knowledge-intensive, innovation-driven economy needs innovative and creative individuals in business, government, and the various professions. Singapore's education system has an important role to play in equipping the young with the right qualities. This could be better achieved by moving away from an overly rigid education system that places undue emphasis on rote learning and examination scores, to an education system that develops students' creativity and critical thinking abilities, and encourages their innate curiosity and willingness to experiment. We examine, as a backdrop, various economic theories of entrepreneurship and, believing that it is important to begin with a good educational foundation, the features of some alternative approaches to pre-school education. We also examine Singapore's attempts to promote independent thinking and creativity among Singaporean students, and other countries' experiences, in particular those of Finland and the Netherlands. Among other issues, emphasis is placed on play and the fostering of students' love of learning, in less structured settings, as the media of learning during early childhood education.

*Keywords:* Entrepreneurship; Pre-school Education; Play-based Learning; Reggio Emilia approach; Montessori Method; Teach Less, Learn More (TLLM) initiative.

*J.E.L. Classification:* I21; I28; I29

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\* Yong and Chongvilaivan are former Research Fellows, Singapore Centre for Applied and Policy Economics (SCAPE), Department of Economics, NUS. Chew's contribution to this paper is based on her Honours Thesis, submitted to the Department of Economics, NUS, in April 2008. The views expressed in this paper are solely those of the authors and do not reflect those of the organizations they have worked in or are currently working in. The authors would also like to thank Basant K. Kapur for helpful comments and discussions.

## 1. Introduction

Singapore has become one of the East Asian Miracle economies by achieving sustained economic growth and a low rate of unemployment since its independence in 1965. This can be attributed to, among other factors, far-sighted government, export-led industrialization, and its success in attracting foreign direct investment (FDI) from multinational companies (MNCs).

Despite its remarkable economic progress, Singapore has to be mindful of increasingly keen competition for FDI from emerging economies, especially China and India.<sup>1</sup> Indeed, the opening up and rise of the Chinese and Indian economies in recent decades have seen MNCs shifting their manufacturing plants and outsourcing their backend offices to China and India.<sup>2</sup> Singapore's natural resource constraints imply that it needs to continually push itself up the value chain to sustain its competitiveness.

As the forces of globalization continually weaken cross-border barriers between countries, the nascent global economic paradigm is a knowledge-intensive one (Porter, 1998).<sup>3</sup> The approach to retaining Singapore's competitive edge in the face of these challenges should then be centered on the pursuit of innovation, a prized asset of a knowledge-intensive economy (Goh, 2005). The new elite in a knowledge-intensive economy will be innovative and creative entrepreneurs who can examine problems from different perspectives without preconceptions, in addition to taking informed initiatives and calculated risks. Value-creating activities that are driven largely by innovation and the entrepreneurial exploitation of knowledge are therefore vital for Singapore's future economic success.

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<sup>1</sup> According to United Nations Conference on Trade and Development's (2007) World Investment Prospects Survey 2007-2009, the most attractive FDI destination countries are China and India.

<sup>2</sup> According to The Global Outsourcing Report 2005, China and India occupy the top two positions for the recent (2005) and future (2015) most competitive and popular IT-outsourcing destinations in the world (Minevich and Richter, 2005).

<sup>3</sup> According to Porter's (1998) classification of economies by a four-phase model of national competitive development, a country must transit from the investment-driven category to the innovation-driven one in order to remain competitive.

The education system plays an important role in equipping our young with economically useful skills and traits. As long as Singapore's economy is driven by MNCs, our workers just need to be technically competent, productive, efficient, and good at implementing the tasks assigned to them.<sup>4</sup> However, with the drive towards an economy that thrives on innovation and value creation, a new breed of individuals, who can think out of the box, figure out the directions they should and would like to take on their own, and take risks, is needed.

Singapore as yet does not seem well-equipped to become an innovation-driven, knowledge-intensive economy, as evidenced by how Singapore constantly ranks highly internationally in terms of institutional factors and infrastructure but does less well in measures of innovation, creativity and entrepreneurship.<sup>5</sup> Some critics have charged that this may be attributable to, among other factors, an overly rigid and specialized education system that places an undue emphasis on rote learning and examination scores, and hampers students' interest, independent initiative, and critical thinking ability. Detractors of the Singapore education system have also argued that excessive education streaming at a young age leaves little room for late bloomers, relegating them to the vocational stream which carries the social stigma of 'It's The End' (Chen, 2002). Others argue that parents who pressure their children to do well academically (and thus indirectly encouraging the schools' focus on academic results) also have to share the blame.

Singapore's effort to bridge this gap was set in motion with the establishment of the Economic Review Committee (ERC) in 2001. In particular, a sub-committee was set up to look into Singapore's education system and policies, as well as other measures to enhance Singapore's human capital to support entrepreneurship and the upgrading of the various economic sectors. This sub-committee on Enhancing Human Capital recommended that to develop Knowledge Based Economy (KBE) skills in Singaporeans,

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<sup>4</sup> As evidenced by many accolades, Singapore's workforce is well-educated, technically adept, and hardworking. Singapore's workers have, for instance, consistently been ranked first by the Business Environment Risk Intelligence Agency (BERI), while the Political and Economic Risk Consultancy Ltd. (PERC) ranked Singapore second in 2005.

<sup>5</sup> See Tables 2-4 in Section 6 for international comparisons.

schools need to be reoriented such that “they are creators of knowledge, engines of innovation and cradles of enterprise” (Ministry of Trade and Industry, 2003).

This paper will focus mainly on pre-school and early school education in Singapore, based on the belief that the stimulation, guidance and nurturing received in the early childhood years have a great influence on how an individual thinks and behaves throughout his life. We believe that it is useful to ‘start at the beginning’, and later studies by us or others can look at higher levels of education in Singapore.

This paper is organized as follows. Section 2 discusses the Austrian School’s views of entrepreneurship, which would help us to identify useful entrepreneurial qualities that could be fostered, to some degree, during the foundational early years of education. Section 3 provides an overview of the current pre-school education system in Singapore. Section 4 examines the importance of play in child development, elaborates on some prominent approaches to pre-school education, namely the Reggio Emilia and Montessori approaches, and reviews the pilot program introducing the Reggio Emilia approach to selected People Action Party Community Foundation kindergartens (PCF kindergartens). Section 5 discusses the Ministry of Education’s (MOE) attempts to promote independent thinking and creativity among Singaporean students, namely its “Teach Less, Learn More” (TLLM) initiative. Section 6 examines the success of the school systems of Finland and the Netherlands in producing innovative, creative, and entrepreneurial individuals. Section 7 concludes.

## **2. Austrian Views of Entrepreneurship**

Austrian economics has long provided insights into the qualities and characteristics of entrepreneurs, insights which also have a broader applicability, to issues of creativity and individual initiative more generally. Such Austrian perspectives emphasize entrepreneurs’ actions and interaction, and their limited and ever-changing knowledge. Before we embark on the features of an educational system that enhances students’ creativity, i.e. the ability to ‘think out of the box,’ it may be useful to highlight the roles

of entrepreneurial creativity and discovery as responses to, or originators of, disequilibrium situations based on Austrian perspectives.

Schumpeter (1934) and Kirzner (1973) are the dominant Austrian approaches to studying entrepreneurship, viewed as a disequilibrium phenomenon. The former views an entrepreneur as an innovative agent who introduces new combinations, i.e. products, production techniques, markets, supply sources, or organizational forms, which in turn challenge the existing firms and perturb the existing equilibrium.<sup>6</sup> The Schumpeterian entrepreneur makes use of his knowledge and intuition to carry out new combinations of the market's existing resources.<sup>7</sup> In this sense, Schumpeter deems entrepreneurship as a crucial mechanism of 'creative destruction,' creating new products or production techniques and thereby challenging the old.

The Schumpeterian entrepreneur is motivated by the 'joy of creating, of getting things done, or simply of exercising one's energy and ingenuity' (Schumpeter, 1934, p. 93). However, many factors may hinder the process of introducing new combinations. For instance, habits and routines embedded in one's sub-consciousness may hamper attempts to conceive new combinations. This implies that a greater effort is required for the entrepreneur to carry out new combinations since he has to go against established practices, conceive new combinations, and persuade himself of the possibility of success. Moreover, even if these negative habitual influences are weak, the deviations from the norm or the established standard may spur societal resistance. As noted by Schumpeter (1934, p. 87), this resistance 'manifests itself first of all in the groups threatened by the innovation, then in the difficulty in finding the necessary cooperation, finally in the difficulty in winning over consumers.'

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<sup>6</sup> New combinations refer to the extent to which entrepreneurs exploit opportunities by continuously combining intermediate inputs, production techniques, markets, and organizational forms to introduce new products, new markets, and new supply sources.

<sup>7</sup> "...in economic life action must be taken without working out all the details of what is to be done. Here the success of everything depends upon intuition, the capacity of seeing things in a way which afterwards proves to be true, even though it cannot be established at the moment..." (Schumpeter, 1934, p. 85).

In contrast, Kirzner contributes to the theory of entrepreneurship by taking ‘entrepreneurial alertness’ into consideration.<sup>8</sup> He regards an entrepreneur as an arbitrageur who discovers hitherto unperceived profit opportunities and moves the market towards equilibrium. When recognizing these opportunities, the Kirznerian entrepreneurs are able to convert scattered and dispersed knowledge into profits by arbitraging across price differentials, thereby driving the economy towards equilibrium. In a static setting, the only feature of the Kirznerian entrepreneurship that matters is the entrepreneur’s alertness to hitherto unperceived opportunities. However, in a dynamic setting, the notion of entrepreneurial alertness incorporates a perceptiveness to the way creative and imaginative actions play a vital role in shaping the transactions entering future periods. In this regard, the entrepreneur has to envision what is yet to be, and pass judgment regarding which of the present trends is likely to reign in the future (Kirzner, 1994).

Nevertheless, the Kirznerian entrepreneurship theory has received criticisms. That is, Kirzner assumes that entrepreneurs are unable to create opportunities as the existing opportunities are exogenously given (Vaughn, 1994). In other words, Kirznerian entrepreneurs cannot create new opportunities but can only either exhaust the set of available opportunities or rely on its exogenous changes. In this sense, Kirznerian entrepreneurship fails to capture the creation of business opportunities which are often the crucial aspect in real-world entrepreneurs, e.g. they are indeed able to create opportunities by introducing true novelty.

In contrast with the Austrian paradigm, neoclassical economics is largely ‘entrepreneurless’ (Bianchi and Henrekson, 2005), and fails to satisfactorily account for entrepreneurship. The neoclassical framework is basically concerned with the analytically more tractable issues of optimization and resource allocation and therefore neglects the subjective attributes of entrepreneurial functions and entrepreneurship.

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<sup>8</sup> Kirzner is widely known as one of the most prominent members of the Austrian School of Economics. His theory of entrepreneurship is based on Mises’ (1949) embodiment of the entrepreneurial element in human actions and Hayek’s (1937) notion of coordination and gradual learning.

A number of recent studies have attempted to model entrepreneurship in the neoclassical framework. They deem an entrepreneur as an idealized agent with systematic responses to risk, as captured by known probability distributions. This facilitates rigorous mathematical treatment, at the cost of abstracting from Knightian uncertainty (Knight, 1921).

Entrepreneurship is also sometimes modeled by the extent to which agents have different levels of entrepreneurial ability, i.e. business acumen, managerial, and organizational skills. This entrepreneurial ability typically enters the neoclassical models as parameters in cost or production functions (Lucas Jr., 1978). For instance, Iversen et al. (2008) model entrepreneurship such that those with low entrepreneurial ability work as administrators, employees, and laborers, whereas those with high entrepreneurial ability end up as business owners and managers.

Some other neoclassical studies have, as mentioned, further focused on modeling the risk-bearing characteristics of entrepreneurs. Assuming heterogeneous agents with respect to their risk aversion and imperfect insurance markets, Kihlstrom and Laffont (1979) show that agents with low degrees of risk aversion will become entrepreneurs and act as the residual profit claimants. Similarly, Kanbur (1979) developed a model of occupational choices in which agents face an ex ante decision whether to become entrepreneurs (risk bearers), or to work for a certain wage.

In sum, the Austrian entrepreneurial theory provides useful insights. It highlights the uncertain and varied environments that entrepreneurs often have to work in, and describes how entrepreneurship at the individual and organizational levels brings about economic progress. Important psychological and personal qualities that entrepreneurs should have include creativity, alertness, originality of perception, discovery of opportunities, envisioning the future through human imagination, and resource combination ability. Therefore, to nurture entrepreneurs, the optimal education system should aim to foster some or all of these qualities in students from a young age.



### 3. Overview of the Pre-school Education System in Singapore

The Singapore education system is widely believed to be effective, particularly in the areas of science and mathematics. This is reflected by the fact that students' academic performance is not just improving, but also internationally competitive.

It has been reported that the percentage of students who passed the Primary School Leaving Examination (PSLE) increased from 96.7 percent in 2001 to 97.7 percent in 2006.<sup>9</sup> Furthermore, the proportion of those who obtained at least 5 'O' Level passes went up from 80 percent in 2001 to 82 percent in 2006, and 90.5 percent got at least 2 'A' and 2 'AO' Level passes in 2006, compared with 87.9 percent in 2001.

Internationally, Singapore was ranked among the top 10 countries in terms of the number of medals won in the Physics and Biology Olympiads in 2007.<sup>10</sup> Moreover, the Trends in International Mathematics and Science Studies (TIMSS) 2003 reported that Singapore's students topped their respective mathematics and science categories.<sup>11</sup> These striking results have prompted many American schools to employ Singapore's textbooks to improve their students' performance. Currently, 250,000 students in the US are using Singapore's mathematics textbooks.

Although the education system in Singapore tends to lead to good examination and test results, it has received a number of criticisms. The system, though encouraging students to do well academically, does not seem to be particularly successful in producing independent, creative, entrepreneurial, and risk-taking individuals. As a result, although

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<sup>9</sup> The data are available from <http://www.moe.gov.sg/media/press/2007/pr20071214a.htm>.

<sup>10</sup> The International Olympiads for Science and Mathematics bring together the best and brightest students from all over the world. They are tested on their mastery of scientific and mathematical concepts, and experimental skills.

<sup>11</sup> The TIMSS 2003 assessed students in their eighth (equivalent to Secondary 2) and fourth (equivalent to Primary 4) grades in more than 50 participating countries on their levels of mathematics and science achievements. Although the TIMSS test may not provide conclusive information about educational quality as countries differ substantially in such factors as student selectivity, curriculum emphases, and the proportion of low-income students in the test, many educators and policymakers view the TIMSS (and other well-conducted international assessments) to be a rich source of data about science and mathematics education (Jenkins, 2000).

the Singapore workforce is relatively competent in technical skills and high in productivity, it performs less well on measures of innovation, creativity, and entrepreneurship in international competitiveness rankings.<sup>12</sup>

A possible reason for this is that Singapore's education system is characterized by a rigid learning structure and an excessive emphasis on homework, drilling, and rote learning.<sup>13</sup> For example, parents have spoken out against the practice of giving children at the pre-school level homework and tests, as well as making them practise the alphabet and copy out words and sentences without understanding (Ho and Ng, 2007). It has also often been reported that Singapore schools attempt to be at the top of school rankings by setting overly difficult mid-year examinations prior to big national examinations at the year-end – PSLE, O, or A levels (Tan and Eng, 2008). Although school teachers and principals believe that setting examination papers of high difficulty levels would help their schools maintain standards in national examinations, anecdotal evidence suggests that ‘thousands of students will be in tears over unwonted failing grades, and thousands of parents’ stress will rise, fearing their children will do as badly in the PSLE or O levels, as they did for their prelims’ (Chua, 2008b). Failure will in turn undermine students’ desire to study hard, their creativity, and their self-confidence (Chong, 2008). The fear and desperation of parents who want their children to do well, and students who want to pass the examinations make the Singapore education system highly ‘reliant and dependent on private tuition and enrichment classes’ (Tan, 2008a). The problem of unfairly tough examinations calls for changes in pre-school and school curricula in such a way that students have more time to learn and play outside the classroom (Ithnin, 2008), and the levels of examination difficulties are commensurate with their abilities (Ho, 2008b).

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<sup>12</sup> In the World Competitiveness Yearbook 2007 by the Institute of Management Development (IMD), Singapore was ranked 2<sup>nd</sup> out of 55 countries overall, but only 26<sup>th</sup> for the level of managers’ entrepreneurship; 13<sup>th</sup> for flexibility and ability of its people when faced with new challenges; 28<sup>th</sup> for the number of patents granted to residents; and 34<sup>th</sup> for the number of patents secured abroad by residents. The same conclusions can also be drawn from the Global Competitiveness Report 2007-2008 by the World Economic Forum and the Global Entrepreneurship Monitor 2006 by the London Business School.

<sup>13</sup> These characteristics of Singapore’s Education system are the motivation of the ‘Teach Less, Learn More’ initiative. It aims to reduce ‘quantity’ in education in terms of “rote learning, repetitive tests, and following prescribed answers and set formulae” (see <http://www3.moe.edu.sg/bluesky/tllm.htm>).

There is anecdotal evidence that time for free play for children in Singapore has been significantly reduced due to Singapore's rigid, academic-oriented school curriculum, and an overly competitive education system. During holidays, students have to return to school for remedial classes, school projects, holiday assignments, co-curricular activities, and enrichment programs (Singh, 2007). A survey of 332 Primary 5 students in 2002 revealed that the children surveyed not only spent close to two hours per day on homework, but also had non-school work, such as tuition and music lessons (Au and Sahaimi, 2006). As we will argue below, play is important to childhood development. The improvement of Singapore's education system therefore calls for play, especially in the early years of education, to be included along with academic and social enrichment opportunities so as to achieve optimal child development.

Following its adoption of the vision statement, Thinking Schools, Learning Nation (TSLN) in 1997, MOE has embarked on a new phase of education aiming to 'engage learners and prepare them for life, rather than teaching more, for tests and examinations,' namely the "Teach Less, Learn More" (TLLM) initiative.<sup>14</sup> In a nutshell, TLLM encourages schools to come up with innovations, including customizing or integrating their curriculum, adopting an innovative teaching approach, and facilitating inquiry- and problem-based learning.<sup>15</sup> Schools receive a lot of support from MOE to implement TLLM, particularly in terms of funding, pedagogical training, and assessment training.<sup>16</sup> On top of that, MOE also provides them with assistance in terms of curriculum design (Channel NewsAsia, 2006). However, TLLM does not seem to be widely implemented on the ground as Singapore's education is still significantly characterized by examination-based learning. The evidence shows that in 2008, '97 out of the 100 students polled had either private tutors or attended lessons at centers' (Chua, 2008a). The 'sure fail' examination tactics and the prevalence of tuition centers may imply that

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<sup>14</sup> See "Speech by Mr. Tharman Shanmugaratnam, Minister of Education," at The MOE Work Plan Seminar 2005, on Thursday, 22 September 2005 at the Ngee Ann Polytechnic Convention Centre. It is downloadable from <http://www.moe.gov.sg/media/speeches/2005/sp20050922.htm>.

<sup>15</sup> For example, movie-making was employed to spur student interest in food and nutrition, and the Rubik's Cube was used to learn Chinese proverbs.

<sup>16</sup> MOE has introduced a new support package, called "TLLM Ignite!," to fund School-Based Curriculum Innovations (SCIs). With this new package, each school, when approved by MOE, will get S\$15,000 in funding to help them carry out innovations for the next three years.

Singapore's education system has gone wrong to the extent that even a talented child needs tuition and therefore may cast doubt on schools' efficiency (Ho, 2008a).

Given the problems of the Singapore education system in general, improvements must be 'from the ground up', i.e. not overlooking the early education system. In Singapore, even though pre-school education is not compulsory, more than 95 percent of children between the ages of 4-6 participate in it (Tan, 2007).<sup>17</sup> Currently, all pre-schools in Singapore are considered to be privately-owned.<sup>18</sup> Pre-school education providers are the People's Action Party Community Foundation (PCF), private for-profit businesses, religious groups, childcare centers, and international schools, among others. Kindergartens comprise three levels: Nursery (4 year-olds), Kindergarten One (5 year-olds), and Kindergarten Two (6 year-olds). Except for foreign pre-schools, all pre-schools follow the time-pattern of the formal education system – four ten-week terms with a one-week vacation after the first and third terms, a four-week mid-year vacation, and a six-week vacation at the end of the year. The first medium of instruction is English with Chinese, Malay, or Tamil as mother tongue languages.

A number of government initiatives have been implemented over the years to improve the pre-school education system. One of MOE's earliest initiatives was to introduce one-year programs, known as the Pre-Primary Program (1979-1990) and the Preparatory-Year Program (1991-1993). These initiatives were aimed at the provision of pre-school education within the formal education system by admitting five-year-old children into selected primary schools. However, these one-year programs have ceased

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<sup>17</sup> Pre-school education refers to the educational programs offered by kindergartens, which have to be registered with the Ministry of Education (MOE), and childcare centers, which have to be licensed by the Ministry of Community Development, Youth, and Sports (MCYS). The difference between kindergartens and childcare centers is that childcare centers not only run kindergartens (for 4-6 year-olds), but also admit children aged between 18 months and 4 years.

<sup>18</sup> However, it has been argued by Chua (2008c) that the Singapore government should give more financial subsidies for early childhood education and care (ECEC) for three main reasons: First, "Recent research has shown the critical importance of quality ECEC in raising children, who are stronger cognitively, have better learning skills and are better adapted socially." Second, "state investment in ECEC can help reduce the socioeconomic gap...In other words, investing in ECEC raises the chances that a child from dysfunctional or poor socioeconomic background can get out of the poverty trap." Last, the reason "...why it makes economic sense to view ECEC provision as a shared responsibility is its impact on women's labor force participation rates. When caring for children is 'privatised' and viewed as a private family matter, the burden of childcare often falls on the mother, especially in patriarchal Asian societies like Singapore."

since 1994 because it was found that an extra schooling year required a significant increase in the amount of financial and manpower resources (Tan, 2007).

Secondly and more recently, to enhance the quality and affordability of kindergarten education, MOE plans to increase the annual funding (Recurrent Grant) to eligible kindergartens from S\$17 million in 2008 to S\$62.5 million by 2013.<sup>19</sup> Recurrent funding will also be introduced for eligible not-for-profit childcare centers to enhance their quality, affordability and accessibility. The funding will amount to up to SGD\$21 million per year by 2013, and can be used to recruit better qualified teachers, have smaller class sizes and provide learning support programs for children who need more assistance. In addition, government childcare subsidy for children aged between 18 months to 6 years enrolled in childcare centers licensed by MCYS has also been increased from SGD\$150 per month to a maximum of SGD\$300. As for families with children in kindergartens and having financial difficulties, they are eligible for financial assistance from government under the Kindergarten Financial Assistance Scheme (KiFAS). Those with more than one child can also receive funds from the Children Development Co-Savings, or 'Baby Bonus', Scheme, for the payment of pre-school fees.<sup>20</sup> Moreover, several community-based organizations have implemented a number of financial assistance schemes to alleviate the costs of pre-school education for children from poor families.

Thirdly, since 2000, MOE and MCYS have imposed some standards in order to help ensure a minimum educational quality in pre-schools. More specifically, in 2003, MOE disseminated a curriculum framework to pre-schools to set out the desired outcomes together with the principles and practices of pre-school education.<sup>21</sup> Based on

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<sup>19</sup> The eligibility criteria are that they: (1) must be non-profit bodies registered under Section 29 of the Companies Act with paid-up capital of at least 5 million Singapore dollars; (2) should not have any religious or racial affiliation; (3) must offer good two-year kindergarten programs with good track records; and (4) must meet MOE's targets for trained teachers and supervisors and the Pupil-Teacher Ratio (PTR). The increase in recurrent funding to S\$62.5 million is part of the marriage and parenthood package announced by PM Lee Hsien Loong during his National Day Rally Speech on Aug 17 2008.

<sup>20</sup> Introduced in 2001, the Baby Bonus scheme aims to encourage couples to have more children by helping to defray the costs of raising children.

<sup>21</sup> The principles and practices of pre-school education are portrayed in Table A1 of the Appendix.

this framework, pre-schools are expected to encourage children to engage in inquiry-based learning within play-oriented contexts, and self-appraisal and external assessment are employed to help ensure their quality. From 2011, those pre-schools who have undergone both self-appraisal and external assessment are eligible to apply for accreditation of their quality. Nevertheless, the overall improvement of pre-school education following the revised curriculum framework is uneven across pre-schools. It has been estimated that 40 percent of the PCF kindergartens have not met the standard in the pre-school curriculum framework. Furthermore, it has also been observed that there are listless teachers who teach insipidly though having learnt a project-based curriculum (Ho and Ng, 2007).

Last but not least, MOE and MCYS have attempted to upgrade the quality of pre-school teachers by providing scholarships and bursaries to help them upgrade their professional qualifications, and nominating the outstanding pre-school teachers. If nominated, they will be appointed as mentors to other teachers and given opportunities to attend mentoring courses, overseas conferences, and study trips. This will lead to the development of teaching expertise in the pre-school sector as a whole via the sharing of teaching experiences. The minimum academic and professional qualifications of pre-school teachers are being raised.<sup>22</sup> For example, pre-school principals are to obtain a Diploma in Pre-school Education-Leadership and have two years of relevant experience. The consistency of pre-school teacher training courses is also sought to be maintained via accreditation by the Pre-school Qualification Accreditation Committee (PQAC).<sup>23</sup>

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<sup>22</sup> It has been targeted that by 2013 each pre-school should have at least 75 percent of teachers satisfying the minimum standards prescribed in Table A2 of the Appendix.

<sup>23</sup> The pre-school teacher training courses include CPT, DPE-T, DPE-L, and the Specialist Diploma in Pre-school Education (SDPE). The PQAC comprises representatives from the pre-school sector and tertiary institutions.

## **4. Play-based Learning in Pre-school Education**

### *4.1 The Importance of Play in Child Development*

It has been recognized by a number of educators and researchers that play contributes to a child's development. Research has shown strong links between play and the language, physical, and social development of children. The main benefits of play, as gleaned from the various research studies, are summarized as follows.

“Play allows children to use their creativity while developing their imagination, dexterity, and physical, cognitive, and emotional strength. Play is important to healthy brain development. It is through play that children at a very early age engage and interact in the world around them...Play helps children develop new competencies that lead to enhanced confidence and the resiliency they will need to face future challenges. Undirected play allows children to learn how to work in groups, to share, to negotiate, to solve conflicts, and to learn self-advocacy skills. When play is allowed to be child driven, children practice decision-making skills, move at their own pace, discover their own areas of interest, and ultimately engage fully in the passions they wish to pursue” (Ginsburg, 2007, p. 183).

Play is an essential part of the academic environment. “It has been shown to help children adjust to the school setting and even to enhance children's learning readiness, learning behaviors, and problem-solving skills” (Ginsburg, 2007, p. 183). For instance, Smilansky (1990) studied the roles of dramatic and socio-dramatic play in cognitive and socio-emotional development based on the observations of 3 to 6 year-olds at play in a number of pre-schools in the US and Israel.<sup>24</sup> Play is found to be directly linked to a wealth of skills that are essential for academic success – better verbalization, richer vocabulary, better problem-solving strategies, higher intellectual competence, more

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<sup>24</sup> Dramatic play comprises four elements: (1) the child undertakes a make-believe role; (2) the child uses the make-believe to transform objects into things necessary for play; (3) verbal descriptions or exclamations are employed at times in place of actions or situations; and (4) the play scenarios last at least ten minutes. In socio-dramatic play, there are two additional elements: (1) at least two players interact within the play scene; and (2) there is verbal communication involved in the play.

curiosity, greater empathy, better emotional and social adjustment, more innovation, more imaginativeness, and so on.

In particular, play helps in the development of problem-solving skills. One type of problem-solving skills is called ‘convergent’ problem-solving, where there is one solution to a problem. Another type is ‘divergent’ problem-solving, where there are many possible ways to solve a problem. It has been found that a school generally teaches children to answer questions correctly, but play teaches them to think ‘outside the box’ and helps them cope with ‘divergent’ problem-solving. If one wants children to grow up with creative capacities, then play is essential (Hirsch-Pasek and Golinkoff, 2003).

The importance of play in nurturing children’s development has been substantiated by a number of studies. Der Spiegel (1997) compared 50 play-oriented kindergartens with 50 academically-oriented ones in Germany and showed that children from the play-oriented kindergartens excelled over the others in every aspect – physical, emotional, social, and intellectual development. The results were especially striking among lower-income children, who clearly benefited from the play-oriented approach. The overall results were so compelling that Germany switched all its kindergartens back to being play-oriented.

Several of the studies have focused on the importance of child-driven play. Schweinhart and Weikart (1997) examined the benefits of play-oriented programs, where play is child-initiated, based on 69 low-income children aged between three and four. Based on their study, pre-school programs that promote child-driven play activities contribute to the development of an individual’s sense of personal and social responsibility.<sup>25</sup> A recent study by Marcon (2002) also found that those who had attended

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<sup>25</sup> The children were randomly assigned to one of three types of programs: (1) the High/Scope group dealt with child-driven play; (2) the Direct Instruction group was academic and adult-driven – it received much instruction in academic subjects; and (3) the Nursery Program was a combination of the first two. They found that, as the children grew up, those who had been in the High/Scope group and Nursery Programs succeeded in schooling and life more significantly than those in the more academic Direct Instruction group, e.g. less delinquency and fewer years of special education for emotional impairment.



play-oriented pre-school programs, in which child-driven activities predominated, performed better academically than those who had attended academic-oriented programs.

More recent research looks at how children learn in terms of brain development. Wilson (1998) found that a large part of a brain is linked to human hands. Since the brain is linked to everything else – to language, to movement, to social and emotional experiences, getting children involved in hands-on activities will help to stimulate the development of the brain. This implies that it is essential for children to explore the world through play, movement, language, and hands-on activities.

A similar link between play and creativity in adulthood was found by Brown (1999), based on interviews with prisoners and winners of the MacArthur “genius” award, given by the John D. and Catherine T. MacArthur Foundation. The results indicated that the former did not have a history of play in their lives whereas the latter had a rich history of play from childhood onwards. Brown (1999) concluded that healthy, varied play in childhood is necessary “for the development of empathy, social altruism and... a repertoire of social behaviors enabling the player to handle stress. It fosters curiosity, is a major catalyst to learning, and through long acquaintance with playful imagination, gives angry provoked individuals’ alternatives to acting impulsively and violently.”

#### *4.2 Alternative Approaches to Pre-school Education*

There are two alternative approaches to pre-school education that encourage play-based learning – the Reggio Emilia approach and the Montessori Method. Viewed as compelling, progressive alternatives to traditional education, they are increasingly being adopted in many countries all over the world. Their respective historical origins, philosophical beliefs, and features are as follows.

##### *- The Reggio Emilia Approach*

The Reggio Emilia approach was founded by Loris Malaguzzi after World War II in 1946 for children under the age of six attending public childcare and education programs in

Reggio Emilia, a small city in Northern Italy. With its unique, innovative set of educational philosophies, pedagogy, methods of school organization, and environment design, the Reggio Emilia approach has been recognized as one of the best early childhood education systems in the world by educators and researchers (Edwards, et al., 1993; and Dahlberg, et al., 1999). The Reggio Emilia approach has been envisioned as an “education based on relationships” – an approach emphasizing the interaction between children and their peers, family members, teachers, and the environment. There are five distinctive features of the Reggio Emilia approach:<sup>26</sup>

1) A Child-centric Philosophy: At the core of the Reggio Emilia approach, children are “rich in resources, strong, and competent...unique individuals with rights rather than simply needs” (Rinaldi, 1998, p. 14). Instead of submissive recipients of knowledge from their teachers, children are able to actively create knowledge based on their perceptions and interactions with others (Institute of Early Childhood & Research, 2008). Children’s representation of their contextual knowledge is expressed through multiple platforms that Malaguzzi (1993) terms as the “hundred languages of children” – speech, music, writing, painting, building, and so forth.

2) Teachers as Children’s Partners in Learning: The Reggio Emilia teachers view children as being curious and resourceful, and explore, discover, and learn together with them. In this regard, teachers are not mere observers, and they neither lead nor follow children in their learning. Instead, their role “derives from and cannot be separated from the image of a child” (Bredenkamp, 1993, p. 16). Teachers and children are partners in the co-construction of knowledge, empowering children to be active contributors to their own education (Institute of Early Childhood & Research, 2008).

The same group of children and teachers is kept together throughout their three years in the school, fostering a sense of community that characterizes the relationships

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<sup>26</sup> It should be noted that Reggio Emilia educators “express hesitation over writing down the principles of their approach because they so highly value questioning, reflection, research, and adaptation” (Malaguzzi, 1993). Therefore, the principles discussed thereafter should be considered in unison as a single, integrated entity, with each principle influencing, and simultaneously being influenced by other principles (Gandini, 1998).

between adults and children (New, 1993). Two teachers take care of each class.<sup>27</sup> Under the Reggio Emilia approach, there is no fixed curriculum, scope or schedule. Learning themes and objectives are tailored to the idiosyncrasies of the children in the class. They plan experiences for the class by “listening, observing, asking questions, reflecting on the responses, and then introducing materials and ideas children can use to expand their understanding” (Rosen, 1992, p. 82). Teachers also work together with the *atelierista*, an arts specialist, who “makes possible a deepening in the instruction via the use of many diverse media” (Edward, et al., 1993, p.10). Even the auxiliary personnel, such as cooks and custodial staffs, are involved in the development and execution of educational goals and field trips (Borgia, 1991). Across schools, teachers’ efforts are coordinated by the *pedagogista* (curriculum team leaders) and the head administrator who reports directly to the town council of Reggio Emilia (The Institute of Early Childhood & Research, 2008).

3) Projects and Documentation: In the Reggio Emilia schools, project work is the main conduit of learning. Children’s thought processes are honed through a ‘cycle’ of responses, recording, playing, exploring, and hypothesis building and testing (New, 1991). This honing of thought processes is reflected in their creations which may take the form of any of the “hundred languages of children” (New, 1993). As children’s partners in learning, the Reggio Emilia teachers are with the children throughout the various decision-making stages of a project – picking a topic to study, the choices of research methods to be employed, as well as the selection of materials to be used to express their ideas and understanding. During the course of the project, the Reggio Emilia teachers carefully document the children’s learning process by making transcriptions of their conversations and remarks, taking photographs of ongoing work and activities, and preserving their creations. These are subsequently organized into panels and books shared with other teachers, children, and parents (Gandini, 1993).

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<sup>27</sup> There are approximately 12 children in infant classes, 18 in toddler classes, and 24 in pre-primary classes. This implies small student-teacher ratios – 6 to one in infant classes, 9 to 1 in toddler classes, and 12 to one in pre-primary classes. Besides, the classes with children who have special needs will be staffed by an additional teacher (New, 1993). Infant, toddler, and pre-primary classes correspond to nursery, K1, and K2, respectively, in the Singapore context.

The documentation as a visual, physical record of children's learning process serves a number of purposes. First, it helps to transform private knowledge into public knowledge. When shared with other teachers, children and parents, documentation puts children's knowledge in the public domain. They will be able to see the collective value of their own work. At the same time, parents will be able to have a better understanding of their children's class activities and learning progress, which also serves as a check on the educational quality provided by pre-schools; other teachers will be able to spot differences and draw parallels between classes, and revise and improve upon their own teaching (Institute of Early Childhood & Research, 2008). In addition, documentation is also an instrument to help teachers collaborate and improve teaching quality. As teachers engage in "collaborative reflections so that outcomes are often in the form of collective understandings..., they socially construct new knowledge as they investigate, reflect, and represent children's construction of knowledge" (New, 1993, p. 17). By revisiting and discussing their observations of children's activities, conversations and creations, they become more aware of how the learning process occurs and how their questioning strategies elicit children's responses. This not only serves the purpose of enhancing teachers' reflective thinking and teaching skills, but also sparks children's curiosity and encourages them to find out more about the subject matter on their own.

4) The Role of the Environment: The Reggio Emilia educators often refer to the environment as the 'third teacher' (Gandini, 1998, p. 177), complementing the two classroom teachers. The environment not only is physical space, but also "indicates the way time is structured and the roles we are expected to play. It conditions how we feel, think, and behave; and it dramatically affects the quality of our lives" (Greenman, 1988, p. 5). Children interact and observe the environment through field trips, and they bring it into the classroom via the *atelier*,<sup>28</sup> in which they can explore and spontaneously incorporate any number of materials and methods into their projects. In this sense, their

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<sup>28</sup> The atelier is the art studio, equipped with a wide range of media, such as easels, paints, markers, small objects for collage, items from the environment (shells, leaves, nuts, twigs, and so on), a light table to view the transparency of things, clay, wire, and transparent containers for viewing, and a multitude of other materials (Borgia, 1991).

ideas, understanding, and learning process are expressed and documented through their creations (Edward, et al., 1993).

5) The Role of Parents and the Community: Parents are another pillar of support in the Reggio Emilia approach. Apart from providing financial support, parents actively shape their children's learning journey through *La Consulta*, a school committee with considerable influence over local government policies. Meetings are held in the evening so that working parents do not miss out on discussions with teachers about administrative policies, child development concerns, curriculum planning and evaluation (New, 1993). Parental participation is also evident in special events, field trips, and celebrations (The Institute of Early Childhood & Research, 2008).

In sum, the Reggio Emilia approach is dependent on the synergy among teachers, children, parents, and the society. Consequently, the key to this approach is the building up of *social capital*<sup>29</sup> so as to create seamless, favorable learning experience for children.

#### - The Montessori Method

Pioneered by Maria Montessori in the late 19<sup>th</sup> century, the Montessori Method is an educational philosophy for educating children and is built on the belief that children should be given the freedom to act on their own growth and development. It is an innovative method whose practices and principles are contrary to traditional teaching methods, and still receives much attention nowadays. Though applicable to all stages of education, the Montessori Method focuses mainly on early childhood education.

The Montessori Method was developed from Montessori's own research in the education of children with learning disabilities. She successfully introduced techniques to help them achieve a certain degree of independence. She believed that the same techniques can also be applied in normal children's education. She advocated the use of science as a method of discovering truths about education – the creation of the scientific

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<sup>29</sup> Social capital is defined as “the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions...Social capital is not just the sum of the institutions, which underpin a society – it is the glue that holds them together” (World Bank, 1999).

pedagogy, scientific methods of education, clinical observation, and the application of the knowledge as a guide to improve education methods.

To understand the basic premise of the Montessori Method, it is necessary to begin with Montessori's concept of children as learners. It is rooted in the belief that children are born with the ability to learn on their own without external supervision. The education process has to take into account two key components: the individual child and the environment. Based on this method, the child's needs should be the focus of education, the process of providing an environment commensurate with the child's nature and stages of development.

Montessori firmly believed in the liberty of the children in choosing the activities they engage in. As such, this method regards a school as a prepared environment in which children are free to choose the activities they would like to engage in and therefore free to develop at their own pace. In the prepared environment, the didactic materials are designed to be as self-correctable (easily returned to their original stage) as possible. In addition, Montessori frowned on the use of external discipline to control the behavior of the children and the use of reward and punishment since she believed that discipline should be developed from within. Children with the freedom to choose their work and minimal adult interference will be able to harness their innate potential for development and work towards overcoming the challenges posed by the materials at hand. It is through this cycle of repetition and achieving proficiency that true discipline and independence are developed.

The Montessori Method also rests on the principle that education should cater to the various stages of a child's development. It identifies specific developmental stages at which various attributes of a child manifest themselves, and an appropriate, specifically designed program is required. In particular, this method focuses on the "absorbent mind" period – the period from birth to an age of six, in which children's mental development primarily involves absorbing sensory impression and information from their

environment.<sup>30</sup> This stage is crucial for the child's motor skill and cognitive development and also for the establishment of social and cultural patterns.

There are some other attributes that characterize the Montessori Method and they are as follows. Firstly, the role of teachers differs from the traditional mould. In the Montessori Method, a teacher is a "directress" whose role is to guide the children in their self-development by preparing the materials and introducing the children to their use and then retire to be a "silent presence" in the classroom. A directress also needs to ensure that the environment is set up to inspire the children to learn and then guides them to the appropriate materials. Since the curriculum is based on the principle that children experience crucial periods in their development in which they are sensitive to particular kinds of learning activities, a directress is required to be trained in the clinical observation of children so as to identify their readiness to various learning stages.

Secondly, in the Montessori Method, the curriculum is designed on Montessori's belief that children will acquire self-discipline and self-reliance by learning from their mistakes and develop mastery through repetition of a particular task. The curriculum focuses on various main areas of development, including practical life skills, sensory education,<sup>31</sup> language, mathematics, and more general physical, social, and cultural development.

Thirdly, children are grouped together according to 3-year age ranges – three to six, six to nine, and nine to twelve, so that the younger can learn from the older children, and the older children in turn can learn by teaching the younger. In this way, the older children, who are accustomed to working freely in a structured environment, act as the younger's guide in doing the same. This results in a cohesive social unit. The classroom is structured and orderly designed to accommodate children's needs and to facilitate freedom of motion; for example, the furniture in the classroom is customized to the

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<sup>30</sup> The children's environment encompasses things and people that surround them, such as their teachers, other children, and the didactic materials.

<sup>31</sup> Sensory education is the education that emphasizes the refinement of the five senses: auditory, visual, tactile, olfactory, gustatory senses.

children’s height and weight and is lightweight so that they can easily move it. A series of self-correctible didactic materials specifically designed to impart a particular skill or to integrate various concepts is also used in the classroom. Only by performing the exercise correctly is the child able to complete the task posed by the materials.<sup>32</sup>

Lastly, the Montessori Method also emphasizes the role of family in shaping children’s development. In particular, families are expected to be interested in and supportive of their children’s education. They are also required to attend regular “parent-directress” meetings.

The key features of the two alternative approaches to pre-school education discussed thus far are summarized in Table 1 according to four aspects: Philosophy, Pedagogy, Environment, and Parental and Community Support.

Table 1: Comparing Key Features of the Alternative Approaches.

	<b>Reggio Emilia Approach</b>	<b>Montessori Method</b>
<b>Philosophy</b>	Children viewed as curious, resourceful, intelligent, and capable of creating knowledge based on the relationships formed with others around them.	Children viewed to be able to learn on own accord and develop self-discipline without external supervision or rewards and punishment.
<b>Pedagogy</b>	Hands-on approach: Teachers are children’s partners in the construction of knowledge.	Hands-off approach: Teachers guide children to appropriate didactic materials, and then retire to be a “silent presence” in the classroom.
	Observe and document children’s progress to (1) transform their private knowledge into public one; and (2) facilitate teachers’ collaboration and improve teaching quality.	Observe and assess the children’s readiness to the various stages of learning.
	Project based, expression of children’s learning through the “hundred languages of children” (sketches, clay models, painting, and so on).	Self-mastery through the use of didactic materials to develop their five senses, linguistic, numeric, and life skills.

<sup>32</sup> For instance, children may work with geometric insets and make use of their visual and tactile senses to learn about shape, size, color, and so on.



Table 1: Comparing Key Features of the Alternative Approaches (continued).

	<b>Reggio Emilia Approach</b>	<b>Montessori Method</b>
<b>Environment</b>	Environment as the “third teacher.” Children interact and observe the environment through field trips.	The classroom structure and furniture are tailored to facilitate children’s freedom of motion.
	The atelier (art studio), where children can make use of a wide range of media (paints, clay, leaves, twigs, and so on), is an essential feature of every Reggio Emilia school.	Children can explore and select instructional materials of their liking from a graded series of self-correctable didactic materials.
<b>Parental and Community Support</b>	Provide financial support.	Parents are expected to attend regular “parent-directress” meetings.
	Take part in discussions with teachers and city officials about administrative policy, child development concerns, curriculum planning and evaluation through the La Consulta.	
	Participate in special events, field trips, and celebrations with their children.	

#### 4.3 The Play-based Learning in PCF Kindergartens

Many features of the Reggio Emilia approach and the Montessori Method build upon children’s innate curiosity, and encourage the development of creativity in children. These features are crucial to the development of entrepreneurs and researchers, and the applicability of these educational methods in the Singapore context is thus an important issue. An assessment of the pilot program to introduce the Reggio Emilia Approach to PCF kindergartens will be helpful in this regard.

In 2005, three PCF kindergartens adopted the pilot program based on the Reggio Emilia approach.<sup>33</sup> However, one of them (the PCF kindergarten at Kebun Baru Community Club) has since discontinued the program due to lack of resources.<sup>34</sup> The monthly school fees at the Reggio Emilia PCF schools are largely subsidized since they

<sup>33</sup> Introduced by Lee Wei Ling, the Director of the National Neuroscience Institute, the pilot program was implemented in three PCF kindergartens at Block 254, Bangkit Road; Block 309, Canberra Road in Chong Pang; and Kebun Baru Community Club (Ho, 2007a).

<sup>34</sup> Recently, two new primary schools, i.e. North Vista Primary in Seng Kang and Greendale Primary in Punggol, have also experimented with the Reggio Emilia approach (Ng, 2008).

require twice as many teachers (Ho, 2007a).<sup>35</sup> It has been estimated that the real cost is approximately SGD\$150-220 per month for each student whereas the actual fees are SGD\$120 and SGD\$78 for the Reggio Emilia PCF kindergartens at Chong Pang and Bangkit Road, respectively – compared with the average school fees of SGD\$82 in normal PCF kindergartens.

The Reggio Emilia PCF kindergartens are similar to other PCF kindergartens in terms of physical size and appearance – a row of classrooms located on the ground level of Housing and Development Board flats. The two kindergartens have three-quarter length windows to let natural light in, and are air-conditioned to maintain a bright and cool environment. The classroom is delineated into thematic learning corners, such as information technology and cooking, and is equipped with computer stations, cooking equipment, as well as drawing and painting materials. Furthermore, as discussed later in this sub-section, the school environment for children goes beyond the classroom, into the neighborhood.

In contrast with other PCF kindergartens, the Reggio Emilia PCF kindergartens design their pedagogy and curriculum so as to integrate the school and the community. There are no worksheets, examinations, and spelling tests. Indeed, there are no one-size-fits-all, planned teaching methods in the Reggio Emilia PCF schools. Teachers identify students' interests through discussions with them and plan class activities accordingly. 60 to 70 percent of the class time is spent outdoors exploring the neighborhood, visiting parks, and even kampongs (villages). “Once a week, children explore their neighborhood, with teachers taking the opportunity to introduce words and set them thinking, speaking, and drawing” (Ho, 2007b). Hands-on activities are also carried out in the learning corners in the classroom, such as a cooking themed corner, where children can try their hands at baking. During these activities, teachers may introduce new words, answer children's queries, and ask them questions to further their understanding. At the end of the activities, there are no report cards. Instead, each student has a file of his artwork in which he draws

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<sup>35</sup> In the Reggio Emilia PCF schools, each class of 24 has two teachers, compared to only one in other PCF kindergartens. Moreover, prior to the implementation of the pilot program, the teachers attended two-month workshops by an early childhood educator to train about the Reggio Emilia approach (Ho, 2007b)

what he has experienced before starting class discussions on the experiences from the day's activities.

To keep a record of students' progress in expressing ideas, teachers meticulously document children's learning processes by noting down their discussions, making video recordings, and taking photographs of children at work. At the end of each project, children get to scan their creations (sketches, writing, and so on) into the computer. The teachers then compile their works and photographs taken into books which help children remember and reflect on what they have learnt. In addition, each child's work will be kept in a file, and will be returned to them at the end of the year for them to look back on what they have learnt.

Parental involvement and support are also crucial parts of the Reggio Emilia PCF kindergartens. At the point of enrollment, teachers give an orientation tour to introduce and explain to them the use of thematic learning corners and the activities children will engage in. Parent-teacher meetings are held biannually at the middle and the end of the school year, during which teachers will go through the books and files of children's work with parents, and parents can provide feedback and query the teachers regarding their children's progress.

The benefits of the pilot program adopted by the Reggio Emilia kindergartens are palpable. Parental feedback reveals that "children have grown more vocal, confident, and inquisitive..." and at Bangkit, "95 percent of the 82 parents of K2 pupils surveyed said their children have progressed in areas such as social and problem-solving skills" (Ho, 2007a). The children schooled in these kindergartens are "capable, creative, and curious, and are given free rein to explore and do things themselves" (Ho, 2007b). Moreover, the educational quality improvement in the Reggio Emilia kindergartens helps to narrow the gap between the 'elite' non-PCF kindergartens,<sup>36</sup> where children are from higher income families, and the PCF kindergartens, where students are generally from average or lower-

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<sup>36</sup> An example of the elite non-PCF kindergartens is the Eton House International Preschool which charges up to SGD\$ 1,500 per month.

income families. In this aspect, PCF kindergartens have helped to bridge the opportunity gap between high and low income groups.

Although the benefits of the Reggio Emilia PCF kindergartens are rather certain, the PCF does not intend to extend the program to all its kindergartens, stating the high resource cost as the main reason.<sup>37</sup> Therefore, the problem is how to make this alternative approach affordable. This is perhaps the biggest barrier to introducing this play-based approach to all PCF kindergartens, given that the PCF loses about 20 percent of its teachers every year, and pre-school teachers' salaries are rather low relative to the cost of attaining professional certification (Ho and Ng, 2007).<sup>38</sup>

There are a number of ways to ameliorate this problem. Firstly, the government should consider more investment in the quality of pre-school education via the subsidies to PCF kindergartens or to parents. However, there is competing use for funds for teachers to undergo professional upgrading. Another way is for PCF to form collaborative networks with private organizations<sup>39</sup> and for parents to organize fundraising efforts.

Some may argue that the principles and practices in MOE's pre-school curriculum framework are comparable to the Reggio Emilia approach.<sup>40</sup> However, it has been estimated that 40 percent of PCF kindergartens have not implemented the changes, and that it will take some time before seasoned teachers can adjust their mindsets and methods to meet the standard of the framework (Ho and Ng, 2007). Moreover, the pre-school curriculum framework and the appraisal and accreditation system have not been put in place by MOE mandatorily. There needs to be some impetus, such as parents'

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<sup>37</sup> Recall that each class of 24 students in the Reggio Emilia PCF kindergartens requires two teachers. This implies that it requires twice as many teachers as normal PCF kindergartens.

<sup>38</sup> Pre-school teachers earn approximately SGD\$ 1,200 a month, which is about the same as what receptionists and cooks earn (MOE, 2008).

<sup>39</sup> Private organizations may provide scholarship for equipment, transport for children on their field trips, for example.

<sup>40</sup> Some principles and practices set out in the pre-school curriculum framework are consistent with the pedagogical methods of the Reggio Emilia approach, for example, the principle of "Learning through Interactions" and the practices of "Starting from the Child" and "Observing Children" are consistent with the pedagogical features of the Reggio Emilia approach.

expectations of pre-schools, to make appraisal and accreditation the norm in the pre-school sector in order to make the framework more effective.

The strong academic demands of primary schools may also be the stumbling block to the adoption of play-based learning at pre-schools because pre-schools are under pressure to prepare children academically so that they would be able to cope when they enter primary schools. Parents are also concerned that their children in the play-based kindergartens will be less prepared for the demands of primary schools.<sup>41</sup> “Many Singaporean parents, used to the rote learning system used in most pre-schools, were uncomfortable with the lack of worksheets for their children and the school’s ‘learning through play’ philosophy” (Chia, 2008). The adjustment to primary schools may be harder for students in the Reggio Emilia PCF kindergartens than those in the traditional PCF kindergartens because the rigid, highly structured approach to primary school education is akin to that adopted by the traditional PCF kindergartens.<sup>42</sup> Unless the method of teaching changes in mainstream primary schools, even if children were to go through play-based learning, their creativity, confidence, and curiosity fostered in their pre-school days would be inhibited by primary school education.

If pre-schools can teach less in the traditional way and adopt play-based learning more widely, they will be a stepping stone towards fostering children’s creativity and independent thinking. Furthermore, a change in the mindset and norms of primary schools is also indispensable – expectations of pre-school preparation on the part of students should be moderated. Primary schools should also revise their curriculum and teaching approach to sustain children’s curiosity, creativity, and interest in learning.

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<sup>41</sup> The high demands of primary schools may be reflected from the fact that at Primary 1 “teachers expect children to know how to multiply, divide and even work out simple fractions” (Suhaimi, 2007).

<sup>42</sup> A journalist writing in 2003 had commented that in traditional primary schools, “children sit for hours at (their) desks, copy what the teacher has written on the board, complete worksheets, and follow the teacher’s instructions. To every question, there is only one right answer” (“Pre-school play, primary worry”, *The Electric New Paper*, 10 March 2003). Spelling is learnt by memorising rather than phonics or other creative methods, while tests and homework abound. Many parents whose children went to play-based pre-schools also noted that besides losing much of their enthusiasm for learning, their children’s temperament also changed. From being chirpy and confident, they became quieter, more subdued, and less eager to speak up or express themselves.

## 5. Teach Less, Learn More Initiative

MOE adopted “Thinking Schools, Learning Nation” (TSLN) as its vision statement in 1997. This approach seeks to “nurture a spirit of Innovation and Enterprise (I&E), build up a core set of life skills and attitudes, and promote the mindsets we want to see in our students, teachers, and school leaders beyond.”<sup>43</sup> In recent years, MOE has introduced a raft of changes intended to “give our young the chance to develop the skills, character and values that will enable them to continue to do well and to take Singapore forward in the future” (MOE 2006).

One of the key changes is the “Teach Less, Learn More” (TLLM) initiative in schools.<sup>44</sup> It focuses on the quality, rather than quantity, of education – “recognizing more talents besides academic achievements, providing more flexibility in the school curriculum and streaming system, and introducing new pathways – all to help all our students discover their interests and talents, and know that through our education system they can go as far as they can.”<sup>45</sup> Furthermore, the TLLM initiative is intended to nurture young Singaporeans who ask questions, look for answers and are willing to think in new ways, solve new problems and create new opportunities for the future. Measures include the trimming of syllabi; getting schools to focus teaching on developing understanding, critical thinking, and the ability to ask questions and seek answers and solutions; and a review of examinations and assessment methods to reduce reliance on rote learning and encourage independent learning and experimentation. Under the TLLM initiative, more resources have been given to schools to help catalyze school-based curriculum innovations (SCI). Examples of SCI include curriculum customization, curriculum integration, differentiated instruction, inquiry-based learning, and problem-solving learning.

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<sup>43</sup> Source: [http://www3.moe.edu.sg/bluesky/print\\_tllm.htm](http://www3.moe.edu.sg/bluesky/print_tllm.htm)

<sup>44</sup> This was announced by Prime Minister Lee Hsien Loong in his National Day Rally Speech in 2004.

<sup>45</sup> Source: Speech By Mr Tharman Shanmugaratnam, Minister for Education, at the MOE Work Plan Seminar 2005, on September 22, 2005, the Ngee Ann Polytechnic Convention Centre. Full text is downloadable at [http://www.moe.gov.sg/media/speeches/2005/sp20050922\\_print.htm](http://www.moe.gov.sg/media/speeches/2005/sp20050922_print.htm).

Under the TLLM initiative, MOE's role is to provide two key supports: (1) greater support for teachers and principals in schools; and (2) more flexibility and choice for all learners, regardless of which school or course they might be in. The former involves giving teachers more time and space – reducing the amount of content in the curriculum to make learning more engaging and effective and building space into their weekly timetable to have more time to reflect and share. The latter promotes more diversity in schools to help students discover different talents among themselves, and to have meaningful choices about the education they want to pursue, such as the Integrated Programme schools and Specialized Independent Schools; the greater latitude that students have to take Higher Mother Tongue and Third Languages; and the flexibility offered to normal course students to take some subjects at a more advanced level or pace; the broader-based frameworks for admission into secondary schools; and so forth. It has been reported that during 2000-2006, “MOE spent SGD\$17 million to fund schools’ innovations on teaching and learning” (Channel NewsAsia, 2006).

A long time-lag is typically involved in education, so it may take time before we see the full results of the measures introduced. Since the launch of TLLM, there have been some encouraging signs. More schools appear to be embracing innovative teaching methods that emphasize less on rote learning – schools attempt to encourage active participation and students’ social skills and character. “The students previously had textbook-based lessons...But now, they can search on the internet, go out to the field and move out of the four walls of the classrooms” (Peh, 2007). More project work is also being done in schools.

However, anecdotal evidence suggests that the implementation of MOE's TLLM initiative on the ground may still be patchy. Many of us with children or friends with children in school would invariably have heard that spoon-feeding, drilling and rote learning still feature in schools, notwithstanding the TLLM initiative. Standardized tests, homework, and tuition remain very much a part and parcel of school life. Furthermore, school holidays tend to be packed with school-based activities, such as remedial classes, compulsory holiday classes, and co-curricular activities, and filled with countless hours

of studying because of holiday assignments and tests set right at the beginning of the semester. A study indicates that almost all primary and secondary schools have some forms of classes even during the four-week mid-year school holiday (Ng and Yen, 2008). The heavy academic workload and numerous school activities inevitably result in precious little time left for play and relaxation during the school holidays, not to mention during the school semester (Singh, 2007).

To the extent that rote learning and heavy workload are still prevalent in schools they are a matter of concern to us given their undesirable effects on students' critical and independent thinking abilities and initiatives; they also dull rather than ignite their passion and interest in the subjects. It has been reported that nearly half the primary school pupils do not have enough sleep due mainly to homework, tuition, co-curricular activities, and remedial lessons (Tan, 2008b). The heavy workload, the resulting lack of free time for play and relaxation, and high levels of stress are detrimental to their well-being. "Early childhood experts warn that over-scheduling a child may not only tire him out, but also affect his long-run development" (Suhaimi, 2008). Moreover, keeping a child occupied with classes implies that his time for self-discovery and exploration is taken away. Ginsburg (2007) has emphasized that older children and youth also need unstructured time for creative growth, self-reflection, and stress alleviation. He thus argues for the importance of having recess time in schools to allow students to engage in free play. Schools are also encouraged to be sensitive to the demands made on children outside of schools that may diminish opportunities for free play, such as excessive homework.

We believe that the undue emphasis on rote learning, the heavy workload and high levels of stress are driven largely by the pressure for students to do well academically. The culprits are not just school teachers and principals, but also parents and society. Society at large still primarily uses academic grades to judge the caliber of a person, especially when the person first enters the workforce. Grades are also an indispensable part of the criteria used to determine entry to universities and eligibility for scholarships, even though universities and scholarship bodies are increasingly looking at



non-academic achievements as well. Parents would therefore naturally want their children to get good grades as they see this as their children's key to a good future. Principals and teachers also have the incentive to place emphasis on grades not only because this is what most parents expect, but also because examination results still form a part of the metrics for measuring their schools' performance.

Ironically, with the pressure to obtain good grades, MOE's push for schools to provide a broader, more holistic education may well have had the unintended effect of making students feel more squeezed than ever. Students (and their parents) now feel that they have to build up a resume that speaks not just of their academic excellence but also active involvement in a wide variety of co-curricular activities and other enrichment activities, so that they can compete effectively for scholarships, university places and jobs. This has, in turn, led to an even heavier workload, higher stress levels, and reduced free time for play and rest.

It should be emphasized here that we are not advocating a reduced focus on academic excellence in schools, but rather a clearer understanding of what 'academic excellence' should connote. Schools should continue to strive towards giving students a good grounding in the basics and fundamentals of their disciplines, and help them to achieve good results. A student can do well in tests and examinations either because he knows and understands the concepts well, and is able to apply them, or because he just engages in rote learning without real understanding. The latter probably represents the easier path to good grades, especially if assessment methods are such that they reward the regurgitation of facts. But students who rely on rote learning would also be less equipped to think critically and independently. On the other hand, the TLLM initiative, by encouraging schools to focus on developing understanding and critical thinking, would allow students to get a good grounding in their disciplines by developing a deeper understanding of the concepts and logic involved. This would stand them in good stead not only in tests and examinations, but also later on in their lives and careers.

Given that parental and societal pressures for students to do well academically are likely to continue, our challenge is two-fold. The first is how to get schools to focus on developing problem-solving and critical thinking skills, rather than rely on rote learning. The second is how to ensure that in the pursuit of academic excellence, students are not subjected to such a heavy workload that they have no time for self-reflection, play and rest.

In view of the complexity of the issues and the many stakeholders involved, a holistic, multi-pronged approach is needed. First, MOE should push the TLLM initiative even more vigorously, and continue to provide the schools with the resources needed to achieve it. MOE should also increasingly move away from providing rankings of schools' performance. Rankings lead to more intense pressure for schools to do well academically, and may add to the difficulty of getting principals and teachers to reduce their reliance on rote learning. MOE could instead consider ways of encouraging schools (principals and teachers) to adopt TLLM initiatives more fully (e.g., through talks and seminars involving senior Ministry officials and education experts).

Second, schools should continue to experiment with and embrace new methods of teaching and assessment that emphasize problem-solving, critical thinking and understanding, and wean students off rote learning. Correspondingly, it should be impressed upon parents that it is the quality, and not simply the quantity, of education that their children receive that really counts in the long term. Of course the fundamentals, especially in more technical disciplines like mathematics and science, should be taught rigorously given that Singapore's economy is likely to remain heavily biased towards Science and Technology. Basic principles should be taught well: applications can be curtailed so as not to burden students with too heavy a workload.

Finally, and perhaps the easiest to achieve, schools should respect school holidays as the time for students to take a break: tests could be set a little further back in the semester, less homework given, and less school-based activities conducted during the holidays. Likewise, parents should not push for too much tuition and enrichment classes

during school holidays, nor should they be overly anxious if their children spend time on non-academic pursuits during the vacation. Only in this way would students get the much needed time for play, rest and personal reflection, and to read what really interests them. This would also help alleviate the stress they face during the school semester.

In summary, if we can successfully introduce play-based learning more widely in pre-schools in Singapore, minimize rote learning in schools, and strike a better balance between academic / other school-based activities and time for personal growth, then our students would have a better chance of developing not just academic skills, but also creativity and other skills needed in the new economy.

## 6. Other Countries' Experiences

At this point, the reader may well ask whether it is possible for us to have more play time or a reduced workload in schools without jeopardizing academic excellence, and quality of the workforce. Based on other countries' experiences, the short answer is yes. The following tables provide comparisons of labor force evaluation in Singapore, Finland, and the Netherlands.

Table 2: World Competitiveness Yearbook 2007 by the Institute of Management Development. 55 countries were covered.

	Singapore	Finland	Netherlands
Overall	2 <sup>nd</sup>	17 <sup>th</sup>	8 <sup>th</sup>
Entrepreneurship of managers	26 <sup>th</sup>	36 <sup>th</sup>	31 <sup>st</sup>
Flexibility and ability of its people when faced with new challenges	13 <sup>th</sup>	34 <sup>th</sup>	20 <sup>th</sup>
Number of patents granted to residents	28 <sup>th</sup>	14 <sup>th</sup>	13 <sup>th</sup>
Number of patents secured abroad by residents	34 <sup>th</sup>	11 <sup>th</sup>	10 <sup>th</sup>
Patent productivity (patents granted to residents divided by R&D personnel in business)	28 <sup>th</sup>	17 <sup>th</sup>	16 <sup>th</sup>

Note: Rankings on "Entrepreneurship of managers" and "Flexibility and ability of its people when faced with new challenges" are computed based on perceptions of executives in top and middle management gathered through a survey.

Table 3: Global Competitiveness Report 2005-2006 by the World Economic Forum (WEF). 117 countries were covered.

	Singapore	Finland	Netherlands
<b>Growth Competitiveness Index</b>			
Overall	6 <sup>th</sup>	1 <sup>st</sup>	11 <sup>th</sup>
Innovation sub-index	13 <sup>th</sup>	2 <sup>nd</sup>	17 <sup>th</sup>
<b>Global Competitiveness Index*</b>			
Overall	5 <sup>th</sup>	2 <sup>nd</sup>	11 <sup>th</sup>
Innovation Factors	14 <sup>th</sup>	5 <sup>th</sup>	12 <sup>th</sup>

\* More comprehensive than Growth Competitiveness Index. Since its 2006-2007 report, the WEF has used the Global Competitiveness Index as its main index. In its latest 2007-2008 report, the overall rankings are Singapore (7<sup>th</sup>), Finland (6<sup>th</sup>) and Netherlands (10<sup>th</sup>); while the rankings for innovation factors are Singapore (13<sup>th</sup>), Finland (6<sup>th</sup>) and Netherlands (12<sup>th</sup>).

Notes: (1) Innovation sub-index for the Growth Competitiveness Index measures areas such as the perception of the role of innovation in a company's performance, the level of R&D spending in the economy, and the overall collaboration of business and academic community in terms of R&D. (2) Innovation factors for the Global Competitiveness Index include sophistication in business sub-factors (e.g., quality of suppliers, sophistication in business operations and strategies) and innovation sub-factors (e.g., quality of scientific research institutions, availability of scientists and engineers, and patents).

Table 4: Global Entrepreneurship Monitor: 2006 Singapore Report by NUS Entrepreneurship Centre (with the London Business School). 22 countries (OECD countries and Singapore) were analyzed.

	Singapore	Finland	Netherlands
Start-up Prevalence Rate (i.e., proportion of population aged 18-64 actively engaged in starting up a new business)	18 <sup>th</sup>	15 <sup>th</sup>	11 <sup>th</sup>
New Business Prevalence Rate (i.e., proportion active as owner-managers of firms less than 42 months old)	11 <sup>th</sup>	12 <sup>th</sup>	15 <sup>th</sup>
Prevalence of Total Early-Stage Entrepreneurial Activity (which is the total of the former two categories)	16 <sup>th</sup>	15 <sup>th</sup>	12 <sup>th</sup>

The rankings indicate that Singapore does less well on measures of innovation, creativity, and entrepreneurship whereas Finland and the Netherlands appear to have been relatively successful in producing individuals who are innovative, creative, and entrepreneurial. The discussions of Finland's and the Netherlands' experience may therefore provide useful lessons for Singapore.

### *6.1 Finland's Experience*

Finland's school system is widely acknowledged to be one of the best in Europe. It invests heavily in education and research in order to sustain a high-wage, high-skill economy. Finland's education and other policies received a resounding endorsement from the World Economic Forum (WEF) when it identified Finland as the world's most competitive economy in its Global Competitiveness Report 2006. The WEF particularly cited Finland's 'culture of innovation.' In the 2003 Programme for International Student Assessment (PISA) ranking, Finland emerged at the top for reading literacy and science, and was second only to Hong Kong for mathematics.<sup>46</sup> In the 2006 PISA, Finland again emerged top for science, and second for reading and mathematics, behind Korea and Taiwan, respectively.

The Finnish system starts with a strong investment in early childhood development. All children below school age (i.e., below 6 years old) are entitled to receive municipal day care either at a day care center or in family day care.<sup>47</sup> Day care costs are calculated according to a family's size and income. For a low income family, municipal day care is free. Parents can also choose to send their children to private day care, and will be entitled to private day care allowance. Over 90 percent of day care services are municipally provided. At 6 years old, children can attend pre-school education free of charge. Pre-school education is provided in day care centers, and in pre-

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<sup>46</sup> PISA compares the performance of 15 year olds in the OECD member countries and partner countries, such as Russia and Brazil. In the 2003 study, there were 40 participating countries, while in the 2006 study, there were 57 participating countries.

<sup>47</sup> Family day care is normally for younger children and is provided in a home-like setting. This can be at the child minder's home, the child's home, or a premise provided by the municipality in the case of group family care.

school classes operating in connection with comprehensive schools.<sup>48</sup> Participation in pre-school education is voluntary, but almost all children take part in pre-school education.<sup>49</sup> The average length of a school day in pre-schools is 4 hours.

Play is very important in the Finnish day care system and pre-school education. The Finns see play as the children's primary way of structuring experiences, solving problems, and creating new things. During play, the child constructs the world in which he or she lives, investigates the surroundings and interacts with them. Play involving objects creates the prerequisites for the use of imagination and fantasy, and children learn through pretend play. As children grow older, they start to be interested in learning to read and write. They like to learn nursery rhymes and play with sounds; they recognize the shapes of words in their environment and draw letter shapes on paper. Fairy tales, stories, and conversation are an essential element in supporting language development. Children are also provided the opportunity of participating in a broad range of activities and of interacting with other children.

Play also helps children to develop their creative imagination in all situations. Its objective is to create a playing and learning environment offering inspiring activities, and provide children with opportunities to develop holistically together with their peers. The methods and activities in pre-school education are made to be as varied and versatile as possible. From the educational point of view, working methods that accustom children to teamwork are of the utmost importance. Another central consideration is to promote their own initiative and to emphasize its significance as the foundation for all activities. The Finns believe that the development of learning capabilities should not focus exclusively on teaching substantive knowledge and facts. There is also no official evaluation system in pre-school education, although the children's development is keenly monitored. Special attention is paid to individual children's readiness for school attendance – the phase of their emotional, social, and cognitive development.

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<sup>48</sup> A comprehensive school provides general knowledge education for entire age cohorts from age 7 to 16. The age of 7 is also the age that children in Singapore enter a primary school.

<sup>49</sup> It has been reported by Ministry of Social Affairs and Health, Finland that 96 percent of all 6 year-old children in 2003 took part in pre-school education. The information is downloadable from <http://pre20031103.stm.fi/english/pao/publicat/paocontents172.htm>.

Having well educated and multi-disciplinary staff is one of the strengths of the Finnish system. Staff in day care centers must have at least secondary-level training in the field of social welfare and health care. One out of 3 staff is required to have a post-secondary level degree (Bachelor of Education, Master of Education, or Bachelor of Social Sciences). Pre-school teachers are required to have either a bachelor or master's degree in education, or a bachelor degree in social sciences with an additional pedagogical course. The adult-child ratio in day care centers is 1:7 for 3 to 6 year-olds and 1:4 for children under the age of 3, whereas the recommended ratio in schools is 1:13 with the maximum group size of 20 students – when group size exceeds 13, the teacher must have an assistant with at least upper secondary level training.

Compulsory basic formal education starts at the age of 7 in a comprehensive school, and is provided free of charge.<sup>50</sup> It is compulsory for all children permanently residing in Finland to complete the basic education syllabus either by attending a comprehensive school or by acquiring equivalent knowledge and skills in some other ways. Virtually all children (99.7 percent) complete basic education. The Finnish children stay in the same school until they are 16 (rather than having primary and secondary schools as in the case of Singapore), and the 9-year education is the same for all pupils. Finland's philosophy is summed up by its Education Minister: "We don't divide at an early stage between students who do well and those that don't manage to do well in schools. Studies show that it is dangerous to divide too early into different educational paths...We believe that if we invest in all children for nine years and give them the same education then we will reach the best results."<sup>51</sup> Furthermore, according to the Finnish National Board of Education, pupils and schools are not compared with one another.<sup>52</sup> Unlike in Singapore, there are no national tests of learning outcomes and no school league tables.

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<sup>50</sup> Services, such as teaching, learning materials, school meals, health care, dental care, and school transport, are available to every student free of charge.

<sup>51</sup> Source: <http://news.bbc.co.uk/1/hi/education/4031805.stm>

<sup>52</sup> Source: Finnish National Board of Education's website at <http://www.oph.fi/english/>

Expectations of students' attainment at the time they enter comprehensive schools also do not appear to be high. Whilst children in Singapore are expected to know their ABCs and basic mathematics when they enter primary schools, children in Finland are expected to learn the basics of reading, writing, and mathematics only when they enter comprehensive schools.<sup>53</sup> The workload in the comprehensive schools also does not appear to be onerous. The maximum duration of a school day is 5 lessons during the first 2 years of basic education and up to 7 lessons after that. This works out to between 19 and 30 hours a week, depending on the pupil's age. Among the OECD countries, pupils between the ages of 7 and 14 in Finland spend the least number of hours in schools. Students also rarely get more than half an hour of homework a night (Gamerman, 2008). In addition, they have longer holidays than their counterparts in the UK, including a 10-week break in the summer.

After obtaining their basic education school-leaving certificate, students can pursue a general or vocational education. General upper secondary education is course-based and ends in a national matriculation examination. Upper secondary schools prepare students specifically for tertiary education and no vocational courses are offered.<sup>54</sup> In the vocational schools, students can take technology and transport, catering and home economics, commerce and administration, among many other options. Vocational qualifications obtained also give eligibility for further studies at universities and polytechnics.

In learning from the Finnish system, two key observations stand out. First, academic excellence needs not to be achieved at the cost of a heavy academic workload and many hours spent in schools. There also appears to be little academic pressure placed on students. Second, play is an important part of the young Finns' education, particularly in pre-schools and early years of basic education. The success of Finland's education

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<sup>53</sup> Source: "National Core Curriculum for Basic Education 2004," Finnish National Board of Education, available at <http://www.oph.fi/english/page.asp?path=447,27598,37840,72101,72106>.

<sup>54</sup> The final examination includes tests in Finnish and Swedish, a foreign language and either mathematics or general studies. Those taking the general studies paper may choose to answer questions on biology, geography, chemistry, physics, history, and social studies, religion, ethics, philosophy, or psychology.



policies is clearly seen in the outcomes achieved, *viz.* Finns who excel academically and are creative and innovative.

## *6.2 The Netherlands' Experience*

The Netherlands is another OECD country that has generally been well ranked for its economic competitiveness, innovativeness, and entrepreneurship. It is also widely considered to have a good education system. In the same PISA studies in 2003, the Netherlands consistently scored above the OECD average for science, reading, and mathematics.

In addition, the Netherlands topped a 2007 UNICEF study on the well-being of children and adolescents in 21 industrialized countries (Finland was ranked fourth).<sup>55</sup> One of the dimensions measured in the study was educational well-being, which looked at the children's achievement in school; the percentage aged 15-19 remaining in education; and how well they transit to employment. The Netherlands scored above average on this measure. But what is more important is that Dutch children were found to be among the happiest in school. The same UNICEF study cited a WHO Survey on Health Behavior in School-age Children in 35 countries, which had the Netherlands topping the table when it came to the children's attitude to schools, along with Norway and Austria. It has been reported that over a third of children aged 11, 13, and 15 in these countries said that they liked school a lot. According to experts, the Netherlands' good performance in the UNICEF study is largely due to the good relationship that Dutch parents have with their children and the fact that less pressure is put on them in school (Westcott, 2007). They cited as examples the short school hours, and the fact that most children go home to play with other kids in the street after school rather than go for organized after-school activities.

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<sup>55</sup> The UNICEF study released in 2007 is called "Child Poverty in Perspective: An Overview of Child Well-being in Rich Countries." 6 dimensions of child well-being were considered: material well-being, health and safety, educational well-being, family and peer relationships, behaviors and risks, and subjective well-being. The Netherlands' average ranking position for all 6 dimensions was the best.

Pre-school education is not formalized in the Netherlands. There is a system of childcare centers for children aged between 0 and 4. These facilities offer young children the opportunity and the space to play and develop in the company of children of their own age. The aim is to stimulate the children's social, cognitive, and emotional development. Childcare also enables parents to take part in activities outside the home, such as a course, training schemes leading to employment, or paid employment. Only a quarter of children under the age of 4 are in formal childcare.

Primary education takes place at primary schools, offering general education for children aged between 4 and 12, free of charge. Compulsory education starts at the age of 5, but 98 percent of all children start primary education at the age of 4. The first 2 years in primary schools are play-oriented, and at the age of 6, the actual reading, writing, and arithmetic education starts.<sup>56</sup> The schools do not focus exclusively on children's cognitive development. They are also expected to pay attention to the development of children's creativity and social, emotional, and physical skills. There is a national standardized test at the end of primary education (CITO-Test) that is, in most cases, compulsory for acceptance to secondary schools.

Secondary education starts at the age of 12. Compulsory education is up to the age of 16,<sup>57</sup> and is provided free of charge.<sup>58</sup> There are 3 levels of secondary education: the 4-year pre-vocational secondary program (VMBO), the 5-year senior general secondary education program (HAVO), and the 6-year pre-university education program (VWO). All levels provide basic secondary education for the initial 2-3 years. The curriculum for basic secondary education is broad, and aims to develop skills and the application of knowledge through independent work, small research projects, and so forth. Thereafter, students in VMBO take subjects that prepare them for secondary vocational education. Those in HAVO and VWO are prepared for higher professional education and

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<sup>56</sup> This is in contrast with Singapore in which reading, writing, and arithmetic education starts in pre-schools.

<sup>57</sup> Young people are then required to attend part-time courses for two days a week for another year (i.e., up to 17 years old). With effect from 2007/2008, part-time compulsory education for 17 year-olds will be replaced with compulsory school attendance for all young people until they attain a basic qualification at the age of 18.

<sup>58</sup> In secondary schools, parents have to bear the costs of school books.

university education, respectively.<sup>59</sup> At the end of basic secondary education, they choose a stream – science and technology, science and health, economics and society, or culture and society, which would prepare them for the field they would like to pursue in higher professional or university education.

Decisions on admission to VMBO, HAVO, or VWO are made by the school board, based on students' CITO test results, recommendations of primary school teachers and principals, and educational performance, interests, and motivation. However, if a secondary school discovers that the initial placement decision for a student is wrong, it will transfer the student to a different pathway at the end of the first 2 years. Up to 25 percent of students do so.

The Dutch also do not believe that all children should move up a grade or sit for examinations at the same age. They recognize that some children will take longer to reach agreed standards, and so they allow grade-repetition in an attempt to ensure that as many as possible reach the same minimum standards sooner or later. It has been estimated that nationally, up to 15 percent of primary pupils and 30 percent of secondary pupils repeat a year. The Dutch feel that this is better than allowing an unprepared child to advance to a more demanding syllabus as the latter is more likely to end in an early departure from education. Besides, pupils who are held back are less likely to feel like a failure when so many others are being held back as well.

Similar to the Finnish system, the Dutch system emphasizes play in the education of their children, especially the younger ones. By giving students a chance to progress at different paces and to switch tracks in school, they are also less likely to feel stressed and pressurized. The Dutch experience shows that children can be happy in school. Their outcomes of education in terms of academic performance and the level of creativity and innovation in the workforce are also comparable to some of the best in the world.

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<sup>59</sup> Higher professional education provides theoretical and practical training for occupations for which a higher vocational qualification is either required or useful. University education focuses on training in academic disciplines, the independent pursuit of scholarship and the application of scholarly knowledge in the context of a profession and aims to improve understanding of the phenomena studied in various disciplines and generate new knowledge (Source: [www.minocw.nl/documenten/en\\_2006\\_2007.pdf](http://www.minocw.nl/documenten/en_2006_2007.pdf)).

In conclusion, from the Finnish and Dutch experiences, we can see that an emphasis on play for young children, as well as less stress in school and more free time outside of school can be achieved without any adverse impact on academic excellence – in fact, the contrary. One may ask how much their education systems cost. As can be expected, the cost of education to the government in Finland and the Netherlands is high, largely because basic education is provided free of charge. In 2005, public expenditure on education was 6.5 percent of GDP in Finland, and 5.3 percent in the Netherlands.<sup>60</sup> In comparison, Singapore’s public expenditure on education was only 3.5 percent of GDP in 2004/05.<sup>61</sup> But given that the young are our future, we should not shy away from making improvements to the quality of education because of cost considerations (within limits), as we will reap the returns on our investment for many years to come.

## **7. Conclusion**

As the saying goes, there is no need to throw out the baby with the bath water. Singapore’s education system has many strengths which have served us well and should be retained.

While adopting more play-oriented approaches to pre-school education, such as the Reggio Emilia Approach and the Montessori Method, is certainly desirable in the Singapore context, the next question that comes to mind is whether children would have any difficulty transiting from inquiry-based learning in play contexts, to formal education (i.e., primary education). While the children may not have problems understanding concepts or interacting with other children, the system of structured study periods and fixed curriculum in primary schools is very different from being able to study what interested them. It would be “one step forward and two steps back” if the creativity in children that had begun to sprout was discouraged by the primary school education system. This calls for continued research into primary and higher levels of education to

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<sup>60</sup> Source: World Development Indicators (WDI) 2007, the World Bank.

<sup>61</sup> Source: Educational Fact Sheet 2006, Ministry of Education, Singapore, downloadable at [www.moe.gov.sg/education/education-statistics-digest/factsheet-2006.pdf](http://www.moe.gov.sg/education/education-statistics-digest/factsheet-2006.pdf).

transform the educational landscape into one that throws up minimal barriers to creativity, but instead enhances children's innate curiosity and love for learning.

Examining other countries' experiences provides a key lesson: In order to train Singapore's future workforce to be more creative and independent in their thinking and have better problem-solving skills, play should be given greater prominence as a medium of learning, especially in pre-schools. In addition, school vacations and after-school hours should not be completely hijacked for school work, tuition, co-curricular activities and enrichment activities; instead, students should be given the time to play as well as rest and re-charge. In this regard, both schools and parents will have a part to play. Importantly too, schools should embrace the TLLM initiative more fully, and adopt teaching approaches that emphasize problem-solving, critical thinking and understanding. Rote learning should be relegated to the bins of history.

All work and no play make Jack a dull boy. It would thus do the proverbial Jack a lot of good to have a healthy balance of study, child-initiated play, and other pursuits, and be taught less so that he can learn more.

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## Appendix

Table A1: Principles and Practices of Pre-school Education

<b>Principle</b>	<b>Practice</b>
Holistic development and learning	Starting from the child
Integrated learning	Fostering a positive learning climate
Active learning	Preparing the learning environment
Supporting learning	Planning and structuring learning activities
Learning through interactions	Setting up resources
Learning through play	Observing children

Source: MOE (2003).

Table A2: Revised Academic and Professional Qualifications Requirements for Pre-school Teachers.

<b>Minimum Qualification</b>	<b>Current</b>	<b>Category A – New Teachers</b> (for all levels, from January 2009)	<b>Existing Teachers</b> (from January 2013)	
			<b>Category B – K1/K2</b>	<b>Category C – Pre-Nursery/ Nursery</b>
Academic	≥ 3 O-Level credits, including English Language	≥ 5 O-Level credits, including English Language	≥ 3 O-Level credits, including English Language	≥ 3 O-Level credits, including English Language
Professional	Certificate in Pre-school Teaching (CPT)	Diploma in Pre-school Education – Teaching (DPE-T)	Diploma in Pre-school Education – Teaching (DPE-T)	Certificate in Pre-school Teaching (CPT)

Source: MOE (2008).