Title	Issues facing teacher curricular and pedagogical capacity in mature and emerging education systems
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Source	*Australian Association for Research in Education Conference, Adelaide, Australia, 27 - 30 November 2006*

Issues facing Teacher Curricular and Pedagogical Capacity in Mature and Emerging Education Systems

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Abstract

Inspired by a two-year intervention project focused on improving Singaporean Normal Technical (the lowest ability stream) teachers' capacity to design and implement authentic and effective pedagogies in three lower secondary core subject areas (science, mathematics and English language), this paper raises issues about teacher professional development found across various international contexts. Like many similar projects in developed and developing countries, this Centre of Research and Pedagogy and Practice(CRPP)-sponsored intervention documents and analyses teachers' content and pedagogical "capacity" (Luke, 2005). It offers teachers comprehensive mentoring in curriculum design and assessment (Wiggins & McTighe, 2005) with the aim of changing teachers' professional beliefs and capacity for pedagogical innovation. Recognizing that teacher professional development is a global conversation, the paper is a self-reflective attempt to compare and problematise the pervasive metaphor of capacity by comparing and problematising the way this is structured across mature and emerging educational systems.

Introduction

Education, in Singapore, as elsewhere, is rife with the tensions that exist globally and are not particularly unique to Singaporean schools (Berlak & Berlak, 1981). Yet, Singapore's remarkable social and economic development has magnified and intensified the problems seemingly all educationalists face in late modernity. Education systems generally work to develop students with capacities to plan their lives carefully, take responsibility for themselves and their families, and contribute to the economic prosperity and social well-being of the nation state. The debate about these goals' instantiation is constrained by the material, administrative, pedagogical, and imaginative capacities of educational systems at all levels to construct intellectually deep and engaging curriculum, effective teaching, and authentic and reliable assessments that initiate students into emerging Twenty-First Century orders of life and work. This is as true for Singapore as it is for Sweden or Swaziland.

"Capacity" has become the defining metaphor to describe educational problems in most educational systems. Working in a two-year Centre of Research and Pedagogy and Practice(CRPP)-sponsored intervention project focused on improving Singaporean Normal Technical (the lowest ability stream) teachers' knowledge and skill in designing and implementing authentic and effective pedagogies in three lower secondary core subject areas (science, mathematics and English language) raises issues about how teacher professional development is framed within the capacity metaphor (Luke, Freebody, Lau, & Gopinathan, 2005). Like many similar projects in developed and developing countries, this intervention offers teachers comprehensive mentoring in curriculum design and assessment (Wiggins & McTighe, 2005). Framed within this particular research context, the paper compares how the problem(s) of teacher capacity is structured across varied educational systems. Self-reflexively, it questions how defining educational problems in terms of capacity is itself indicative of a late-capitalist point of view: Can we become trapped in our own "capacity" discourse?

Singapore's "Capacity" for Change

Singapore is a wealthy and modern country. The Human Developmental Index measuring income, living standards and literacy placed Singapore at 25th out of 177 countries (UNDP, 2005). With its material success, Singaporeans' traditional social beliefs in "collectivism" and Confucian meritocracy compete with late-capitalist values of consumer choice and personal fulfilment (Hofstede, 2001; Triandis, 1996). On the whole, Singaporean education, which is highly structured and standardized, reflects this desire for social order and harmony. National examinations regulate mobility through and across educational pathways. Despite recent reforms, the Singaporean government is committed to maintaining traditional authority and social identities and is reticent to radically overhaul a very didactic, teacher-centred and monologic pedagogical regime (Luke, et al, 2005). And, as it's presently configured, Singapore's educational system enjoys both elite and mass support.

Singaporeans' trust in the education system to equitably bestow credentials and economic benefits fairly reflects their faith in a meritocratic system of competitive labour market human capital distribution. However, the instrumental importance of education for Singaporean students to do well in exams means that they have limited opportunities to learn in intrinsically meaningful ways (Cheah & Robbins, 1998; Luke et al., 2005). While

Singapore's education system has gained a positive reputation through international test comparisons, its successes may come at the expense of others. Research conducted at its National Institute of Education (NIE) in the past three years reveals that chances for engaged learning are rarely offered the vast majority of mainstream and underperforming students. For example, Wong's (2006) study of reading and literacy in eight primary school classes found that teachers generally focused on phonetics at the expense of semantics, on decoding rather than meaning-making, and on didactic and worksheet-orientated lessons rather than elaborated written and oral communication. She concluded that the teaching of reading was uni-dimensional, disjointed and compartmentalized, segmenting the teaching of vocabulary, grammar, phonics, listening, spelling and reading into different and often unrelated skill-based components. Wong's findings corroborate other CRPP researchers' findings taken from observations of over a thousand of the republic's classrooms, i.e. the bulk of Singapore's students' time is spent learning basic factual information and skills. Substantially less time is spent acquiring knowledge in genuine conceptual depth, manipulating and applying knowledge, posing alternative interpretation, engaging in problem-solving or fostering critique. Disciplined, curriculum-focused teaching relying on traditional instructional strategies—lectures, whole class question and answer, worksheets, direct instruction, restricted IRE, tight classroom management, and compliant student behaviour—may all serve the students well during international comparison tests like TIMMS and PIRLS, but provide infrequent opportunities for sustained discussion, debate, and exposition, either orally or in writing (CRPP, 2005).

One way of accounting for the findings of the Core is to argue that teachers and students, and the system as a whole are grappling with complex and reflexive demands between these binary tensions of what we could term as 'residual' and 'emergent' educational cultures (Luke, 2005). These consist of tensions between: social cohesion and collectivism vs. individual achievement and competitiveness; excellence at the top vs. improvement for all; rote reproduction vs. autonomous, independent thought; respect for authority, teachers, traditions vs. critique, originality and creativity; examination, test product orientation vs. learning in and for itself; risk aversion vs. risk-taking; instrumental knowledge vs. theoretical, abstract and creative knowledge; scientific and technical knowledge vs. aesthetic and creative knowledge; and expository knowledge and texts vs. narrative knowledge and texts (Luke, 2005, p. 6).

The immediate challenge facing Singapore's government is how to promote the kinds of human capital in terms of knowledge, skills and dispositions to prepare workers and citizens necessary for 21st Century late-capitalist economies while maintaining social cohesion, confidence, and order. Recently, Singapore's Prime Minister has stated that education should not be viewed solely as an instrument of economic betterment and social mobility, but as an opportunity to learn "to live a life" and become a "person:"

> The most important gift that we can give to our young and to prepare for their future is education. It's not just preparing them for a job, but learning to live a life, learning to deal with the world, learning to be a full person, what in Chinese, they say, "xue zhuo ren" (学做人) and in schools, there are plenty of opportunities to learn to be a person. …We have got to teach less to our students so that they will learn more. Grades are important, don't forget to pass your exams but grades are not

the only thing in life and there are other things in life, which we want to learn in school… (Lee Hsien Long, National Day Rally Speech, 2004)

Clearly, this is a system that is poised for change, but what are the levers that can be pushed, and with what results?

Establishing the context: CRPP and Singapore's educational policy agenda

In the face of the various contingencies facing developed and developing countries— economic volatility, ecological crises, and political instability—the Singapore government has pragmatically yielded to the perceived changing nature of 21st Century futures. Careful (one might say cautious) attempts to manage change and innovation in Singaporean education have been instituted in recent years. However, the rate of the rollout of these reforms, as well as the substantial amount of funding sunk into educational research at a time when other governments are pulling resources out of it leave no doubt about the Singaporean Ministry of Education's (MOE) urgency and commitment in meeting the challenges that globalization and late-capitalist social and economic forces set against traditional pedagogical regimes in their broadest sense. As part of its response, the Centre for Research in Pedagogy and Practice (CRPP), at the National Institute of Education (NIE), Nanyang Technological University (NTU) was established to promote dedicated educational research that reflects the particularity of Singaporean schooling, society, and political economy within current international educational pedagogy and policy debates. Beginning "from a rigorous 'inside out' empirical" stance, and using "documentation and critical analysis of the distinctive demographic and cultural contexts, institutional and classroom contexts of the Asian education systems," CRPP based researchers ask locally important but globally significant questions about schooling "in the face of the need for infrastructure and capacity building, ongoing knowledge dependency and centre/periphery relations, and the contingencies of racial and linguistic, cultural and religious complexity after decolonisation"(Luke et al., 2005, p. 2). CRPP's inception was one of many recent MOE responses to Singapore's requirements to build infrastructure, research, policy, teacher education, and professional development capacities.

Established in 2002, CRPP reflects the MOE's commitment to ongoing substantive quantitative and qualitative research focused on improving pedagogy. CRPP plays an important part in this policy drive to study and actively promote these pedagogical interventions (Luke et al., 2005, p. 6). CRPP initial Core One research was considerably larger in scale and scope than Newmann and Associates' (1995) work on US school reform and the Queensland School Longitudinal Reform Study (Lingard, Ladwig, Mills, Bahr, Christie, Gore et al., 2002). Recently concluded, Core One CRPP Research Project was a comprehensive quantitative and qualitative study of Singapore's school system done to provide evidence for educational innovation and focused on classroom pedagogy, including recent reform initiatives. The more significant of theses changes have also flowed from the Singapore government's "Thinking Schools, Learning Nation" (TSLN) policy (Goh, 1997). Luke et al. (2005) note that TSLN reflects global late-capitalist discourses found in educational systems' statements generally, including "calls for: less risk averse citizen workers, creative and entrepreneurial in recognising and generating new markets and services; capable of continual learning, re-learning, unlearning; dispositionally able to deal with community, workplace and institutional cultural diversity and multilingualism; and

thereby economically flexible in the face of volatile employment and industrial futures" (p. 5). TSLN opened a floodgate of pedagogical adjustments, from reducing curriculum content, reviewing of assessment regimes, initiatives with subject integration and project work, developing of alternative pathways, promoting early childhood education, to expanding opportunities in tertiary education.

CRPP researchers have engaged in many large and small intervention projects in the months following its Core One Report for 2005, which was submitted to Singapore's MOE in March 2006. Informed by the findings, these interventions face complex and technically difficult challenges. CRPP interventions are characterized as "systematic, structured attempts to generate desired or preferred change in the core business of curriculum, teaching and learning and thereby to shift patterns of educational outcomes and effects" (Luke, 2005, p. x). Such work is not a matter of finding the right answer. These systemic and pedagogical intervention professional development research projects are framed in the metaphor of building *capacity*. Their efforts to construct spaces for teachers' professional development are judged against policymakers' requirements to show improved student's cognitive, intellectual, and social abilities.

Core Two research and intervention projects proposed for CRPP from 2008 to 2013 and presently under review by NIE and MOE are similarly framed within the capacity building discourse. Future CRPP research and intervention efforts will be thematically prioritized around identified general government policy settings for the improvement of pedagogical practice, school organization and systemic organisation, with the aim of improving Singaporean student's outcomes. Additionally, "multiliteracies", "disciplinary/transdisciplinary pedagogy" and "balanced assessment" themes will be added to the Core Two intervention and research agenda, reflecting the changing educational landscape and CRPP's research findings. Organized by fields or domain specific knowledge in maths, science, English language and literature, mother tongue languages (Chinese, Tamil, and Malay), social studies, and visual and performing arts, CRPP's proposed Core Two research and intervention plan will be orientated to enduring educational concerns related to cognition, motivation, learning and culture; language and literacies; knowledge and curriculum; measurement and assessment; technology and learning environments; teaching and instructional design; teacher Learning (pre-service and in-service); institutional and policy studies (Hogan, 2005).

The economic, social, cultural and political fate of Singapore historically as a British colony and currently as a sovereign nation has been closely tied to the global economy— "integrated into global value-chains or supply-chains of multinational corporations" (Lim, 2006, p. 1). State policy, since independence, has succeeded in shaping infrastructure and social policy, including labour and education, in line with global capital demands. By the mid-90's, Singapore was able to claim developed nation status by " shifting [its] comparative advantage… through the import and export of labour, skills, and capital [and] intervening to mould competitive advantage [through] targeting the development of specific economic 'clusters'" (Lim, 2006, p. 2). Yet, this policy has brought new challenges. Large sections of the Singaporean populous, commonly known as 'heartlanders,' "lack the linguistic and cultural tools to participate" fully in this global economy and those Singaporeans that do have these often leave for the greater personal and economic scope other developed countries have to offer (Lim, 2006, p. 6). Consequently, Singapore as a 'developed' nation is

continually challenged by other developing countries to maintain its position within late-capitalist economic volatility and must educate larger segments of it citizens to engage productively in its newly identified 'niche' economies, such as the life sciences. The implications of these tensions for Singaporean education are that, like developing countries, school infrastructure and policy must continually be made and remade and, like many developed nations, improving teacher education and professional development is an ongoing struggle.

The establishment of CRPP and its research rationale must therefore be understood as part of the MOE's attempt to develop infrastructure to support its educational reform efforts. These form a necessary background to understanding the context for the "Building Teacher Capacity in Curriculum and Pedagogical Design in Normal Technical Classrooms" intervention project. Part of its context is the prevalence of concept of human capital theory at the heart of discourse of building teacher capacity.

The Metaphor of *Capacity* Building

Implicit in all conceptions of professional development associated with both formal courses and programs or informal school-based mentoring are theories and metaphors of learning. None are likely to capture the full complexity of professional learning. Both dominant stage models of professional growth where educators progressively accumulate valued knowledge, skills, and dispositions along some continuum from notice to expert and their alternatives (Dall'Alba & Sandberg, 2006) view professional development as capacity building. And, this may also be said of infrastructure, policy, and agentive aspects of educational reform and improvement, associated with professional development. O'Day et al. (1995) argue that these form interactive and independent dimensions of capacity where changes in one aspect (for example, infrastructure or policy) can lead to unexpected consequences for others (professional knowledge or sense of agency).

Teacher capacity building is sometimes positioned as a counter argument against neo-liberal discourses of 'accountability' that is dominating educational policy statements with their behaviourist 'competency' standards.' Yet, teachers' effectiveness and responsiveness to changing and unpredictable circumstances, which is one defining characteristic of teacher capacity found in the literature, is framed with similar discourse about the knowledge society/knowledge economy (Storey, 2004). As noted earlier, in Singapore, this is reflected in the language of the Thinking Schools/Learning Nation (Goh, 1997). Educational reform theorists have contended that human intellectual capital as the sum of a teacher's knowledge and experiences and social capital as the extent of her interpersonal networks of reciprocity work in tandem to create effective schools (Hargreaves, 2001). Consequently, the metaphor, capacity building, appears to be an extension of human capital theory, in so much as "its traditional economic connotation (Strober, 1990) [is extended] to include the knowledge, skills, dispositions, and social resources of adults in schools that can applied to promote children's learning and development" (Smylie, 1996, p. 10). By implication then, effective schools require teachers who are responsive to the social, cultural, economic changes affecting students (and their own) futures. Thus hidden within the metaphor of building teacher capacity is the idea of state-sponsored *investment* in teachers' human capital (Smylie, p. 11).

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Human capital theory is based on neo-classical economics and is commonly associated with the Chicago School and the work of the Nobel-prize winning economist, Gary Becker. (For an excellent recount of human capital theory in education see Sweetland, 1996). Positing knowledge, skills, and dispositions as elastic, self-generative, portable and shareable, human capital theory attempts to account for what was previously considered economically intangible. When applied to education, human capital theory implies that the efficient application of resources should be expended "to the point where the present value of returns to marginal investments is equal to the cost. The stream of returns includes both increased earnings and the non-pecuniary benefits of education… [A]s the capital intensity and knowledge intensity of output rises, so does the optimal human intensity" (Quiggan, 1999, p. 140). The promise of human capital theory is that the endowment of human capitals is a social equalizer and the dividends of greater investment in education provide opportunities for greater individual equity (Quiggan, p. 144).

The shift in the discursive metaphor from human capital to human capacity may be seen as a dilution of what some believe is crude economism, but is as well an expansion of what was earlier considered as human capital. Curiously, human capital theory does seem to suggest that there are some capitals that were non-human, outside social relations. But, reworking human capital as "capacity" retains much of the flavour of those previous theories and is open to the same classic critiques of human capital theory. For example, Bowles & Gintis (1975) agree with its assertion that the provision of schooling leads to economic productivity, but argue that it ignores social reproduction. This may account for the blithely optimistic tenor of much of today's school improvement literature. "The failure to encompass social relations and to offer a theory of reproduction accounts for the more serious shortcomings of the standard treatments of the demand for human capital, and the interpretation of the theory's central analytical concept: the rate of return on human capital," they contend (Bowles & Gintis, 1975, p. 75). Noting that, "the social organization of schooling can in no way be depicted as the result of an aggregation of individual choices," and that, "the social relations of education were rarely a reflection of popular demands, expressed through the market or political process," they make the case that school change rarely happens without resistance (p. 77). Further, they argue that education produces more than human capital but also legitimates and mystifies social division based on objective, meritocratic selection (p. 78). Bowles & Gintis provide the standard criticism of utilitarian philosophy from which human capital theory springs, contesting that it "attribut[es] social or personal ills to either the shortcomings of individuals or the unavoidable technical requisites of production (p. 82). Some argue that human capital theory avoids issues of culture, gender, and identity (Fine, 2002; Davis, 2004). "That people might act for social, religious, moral, emotional, or other non-economic reasons, cannot be accounted for in this theory" (Robeyns, 2006, pp. 73). While human capacity as a metaphor attempts to address the strict economism of cost-benefit analysis found in human capital theory by extending the blurring of the economic from the non-economic aspects of human life, the language of 'investment' and 'exchange' remains.

Ultimately, the metaphor suggests volume, which is quantifiable. Yet many of the dimensions of capacity resist measurement. How much teacher professional skill development, content and pedagogical knowledge, dispositions, and agency is enough when faced with rapid social and cultural change and their resulting educational infrastructure and policy reforms? Capacity connotes the finite possibility of being met and acceded. Yet,

unpredictable circumstances and vagaries of human nature would suggest otherwise. We have to consider how economically over-determined the capacity building metaphor is. Are there alternatives to addressing professional development and educational reform as capacity building?

Teacher learning can be valued pragmatically for its immediate utility in the classroom or for the benefits credentials may bring. But, such training is mimetic and unlikely to be transformative in the way teacher capacity building is often talked about. Yet, beyond the utility of learning new skills and knowledge, much of what happens in the name of capacity building doesn't reflect the intrinsic valuing of the kinds of engagements with professional growth likely needed to respond to the changes teachers and educational systems currently face. Many teachers engaged in capacity building activities need to be compensated through receiving pre-packaged curriculum packets, credentialing, reducing duties, etc. in order to get 'buy in.' To develop an ethic that might overcome the instrumental, economist logic of capacity building such that the intrinsic value of professional learning is valued may require a new conceptual metaphor.

Robeyns (2006) has suggested that expanding teachers' *capabilities* may better conceptualise the metaphor to achieve the intrinsic aims often articulated in policy documents. The inalienable right to an education is not tied to returns on human capital investment and places legal and moral obligations on states as well as those who have the means to provide education without restricting access to others who may not be capable of much return. While the right to an education is accepted in international and most national jurisprudence, the guarantee of educational rights is hampered by limitations. Consequently, education's legislated good intentions have rarely been fulfilled. Moreover, education rights can be interpreted as a shallow formalism lacking provision for the means of many to acquire one (pp. 73-78). Referring to Sens (1992; 1999), Robeyns (2006) posits a capabilities approach, defined as:

> the various functionings that a person can attain—whereby functionings are the constitutive elements of living, that is, doings and beings. Examples of functionings are being healthy, being educated, holding a job, being part of a nurturing family, having deep friendships, etc. Functionings are thus the outcomes or achievements, whereas capabilities are the real opportunities to achieve viable states of being and doing. The capability approach is a broad normative framework for the evaluation and assessment of individual well-being and social arrangements, the design of policies, and proposals about social change in society. (p. 79)

While Robeyn (2006) acknowledges that capabilities approach is relatively new, she uses it to advance a critique of human capital theory as a theoretical framework to guide educational, fiscal and budgetary policy. Capability, she argues, can provide criteria for educational rights and intrinsic justifications for things that may or may not have instrumental value (p. 89).

Building Teacher Capacity in Curriculum and Pedagogical Design in Normal Technical Classrooms (BTCNTC) Intervention Project

BTCNTC is a two-year research and intervention project involving 24 Singaporean Secondary One and Two Normal Technical (NT) teachers in the three main subject areas (science, mathematics, and English language). Documenting teachers' capacity to plan effective pedagogy, including assessment, the project offers comprehensive training to help these teachers design, share, and improve their teaching using Wiggins and McTighe's (2005) curricular framework—*Understanding by Design* (UbD) — through various forms of mentorship and collaborative planning. While there is no research on which to base direct, evidentiary claims that UbD has a direct effect on improved student performance, its principles and practices reflect the consensus of educational theorists about what promotes learning. As reported by the National Research Council in the USA (Bransford, Brown & Cocking, 2001, cited in McTighe & Seif, 2003), effective and lasting learning are not achieved through drill and practice; rote recall lacks transfer to knowledge application and problem solving; inexperienced students are likely to be simplistic, unreflexive, and formulaic in their responses; curriculum that focus on coverage does not provide sufficient preparation for further learning and fails to make the necessary connections to scaffold knowledge; summative assessment do not generally provide opportunities for further learning as most of it is factual recall; and students learn best when practitioners have a good understanding of the disciplinary focus of the subjects they teach. UbD's focus on authentic pedagogy and assessment is supported by many international research studies (egs., Newmann et al., 1996; Smith, Lee, & Newmann, 2001; Newmann, Bryk, & Nagaoka, 2001; Martin, Mullis, Gregory, Hoyle, & Shen, 2000; Stiger & Hiebert, 1999; and Hayes, Lingard, & Mills, 2000). In the USA, many national state and local education bodies are presently using UbD to redesign their curriculum. The International Baccalaureate programme used its framework for its Primary Years Programme. And, recently many elite schools in Singapore have adopted it as well. Our UbD-framed research focuses on the potential impact of the intervention on teachers' professional beliefs and capacity for curricular and pedagogical innovation as well as its potential impact on students' learning. The project also raises questions regarding teacher professionalism, NT students, and systemic issues around school and educational structure and reform.

To provide an understanding of the particular setting of the project, i.e. the Normal Technical stream, we sketch, over the next few paragraphs, a background on streaming in Singapore, the students we work with, and the particular challenges facing NT pedagogy informing the rationale of our intervention project design.

The practice of tracking students based on exam performance is a crucial element of Singapore's highly structured education system. Current educational pathways available in the Singapore education system, which are characterized by streaming and high-stakes national examinations, may largely be traced back to the "New Education System" recommended by the Goh Committee in 1979. The Goh committee's report defended streaming as a "logical consequence of the fact that different children have different capacities to acquire knowledge." It further stated that "the system has been structured such that only the brightest 12 to 15 % of schoolchildren can cope" and so "to subject the less able students to the same regime of learning has been the chief defect of our educational system in the past" (pp. 1-5). The Normal Technical (NT) stream was established in 1994 to provide at least ten years of general education to the lowest scoring students (approximately 15% or 7000 students) of each cohort (Ministry of Education, 2000) who, at that time, were dropping out in large numbers after only eight years of primary schooling. The MOE felt the

need to equip these students who were deemed less inclined to academic studies with "the requisite skills and attitudes to enable them to contribute to the national economy" (Ng, 1993), intending to provide them with differential instruction that prepared them for further vocational and technical training at the Institute of Technical Education (ITE) after four years of secondary education. The NT curriculum focuses on strengthening students' foundations in English and maths. In addition, NT students study basic mother tongue (Malay, Mandarin or Tamil, according to one's racial background) and computer applications and sit for the national GCE 'N' level examinations at the end of the fourth year of secondary school.

Ten years after the inception of the programme, the MOE announced a review of the NT curriculum. To keep NT students in school and motivated to learn, recommendations have been made for curriculum and teaching to include more "practice-oriented" approaches; more curricular links to daily life applications; and more student-centred activities like group work, oral presentations, creative and hands-on activities (MOE, 2004). Learning requiring the use of IT would also be deliberately featured in the NT syllabi. Unlike in other streams, NT students have been given the benefit of taking Elective Modules (EM) designed to explore their career interests. As a part of the curricular reform initiatives described above, the lines between the streams (Normal Technical, Normal Academic, and Express) have been blurred by increasing flexibility for lateral transfers, making it possible—but still uncommon—for NT students to be offered one or two subjects at a more advanced level. These reforms were intended to improve student motivation, attendance, and permit more alternative pathways to academic and vocational achievement.

Although there has been a move in recent years to increase available students' educational pathways, low performance expectations coupled with narrowly defined vocational outcomes raise uncomfortable issues. It is impossible to talk of those at the bottom of the Singaporean educational system without acknowledging the tensions that exist within the wider society and the educational culture which play out in schools and classrooms (Luke, 2005)—principally, striving for excellence at the top while attempting to provide improving standards of education for all. There are capacity issues facing both developed/mature and developing/emergent educational systems where widening gaps of performance between children of varied social and cultural backgrounds persist. Streaming or "tracking" (Oakes, 1985) is a well-established, hotly debated and contested practice that is used in many educational systems as a way of attending to diversity in ability and achievement.

NT classrooms consist of diverse, rather than homogenous, students. Although they have been categorically lumped as the weakest students academically, the performance gap among students may be quite wide, with accompanying differences by subject. MOE and CRPP research indicates that when compared to the demographic makeup of other streams, Malays, boys, and children of lower socio-economic families are disproportionately represented in NT classroom (CRPP, 2005). NT students largely come from homes that do not speak English as the first language and with one or more parents with lower than average educational qualifications. Having parents who are not fluent in English was a characteristic of underachieving students (Ow Report, 1992). Low competence in English language is one of the most commonly cited reasons given by students for their inability to understand lessons in school (Chang, 1997). Not speaking English at home disadvantage NT

students because they are less likely to get help from home. Parents' highest educational qualification on student achievement is but one factor of the "combined familial resources," which also include financial, social and cultural capital that have implications on the success of the NT student as he/she navigates the educational terrain (Kang, 2004).

Pedagogy-wise, the NT classroom in Singapore has been criticized as being too academically oriented and examination-driven with an overemphasis on science and mathematics (Luke et al., 2005). While this conforms to how Asian pedagogy is characterized in general: 'chalk and talk', didactic, worksheet and exam-driven, and transmissionist (Gopinathan, Ho, & Tan, 1999). NT students' reports of what goes on in their classrooms do not appear to significantly vary with those of other Singaporean streams. CRPP's research indicates that increased amounts of activity-based and vocationally-oriented work and almost no homework in this stream are two of the more significant differences between the NT and other streams. Some pedagogical practices are unique to NT; others are not completely attributable to either subject or stream specific trends (Luke et al., 2005). Comparing these students' responses within the NT data alone, the salient features of the curriculum are worksheets, behaviour and time on task management, drill and review, with less focus on integration of subject matter, the acquisition of meta-languages and analysis. Teacher directed and explicit instruction is consistent over all subject areas. In the NT stream, the teacher is the source of authoritative knowledge across all subjects. Knowledge is transmitted in a basic/rote fashion in all core subject areas. In the NT stream, emphasis is firmly placed on accepting presented knowledge as truth. The learning of basic skills is emphasised. There are few opportunities created for students to question the validity of given facts. Students are required to reproduce information, rather than actively produce and construct knowledge. NT students are not encouraged to contextualize new knowledge, either theoretically or practically. The NT curriculum is strongly classified, with knowledge highly differentiated and separated into traditional subjects.

The BTCNTC research and intervention project builds on the findings of earlier CRPP-sponsored action research projects. Premised on the core assertion that Normal Technical students received a very narrow and limiting instruction that they did not find useful and is, in fact, alienating, these initial interventions were focused on describing teacher-developed programs for secondary one and two students. In 2004 and 2005, CRPP researchers working in a neighbourhood school investigated the impact on the students' and teachers' involved through small-scale action research projects. These interventions attempted to redesign the curriculum by shifting teachers' thinking about pedagogy by increasing their repertoire of pedagogical methods and attempting to model different approaches in working with NT students. Pedagogical change did appear to happen in some subjects, especially science. But in general, in most classrooms with the exception of computing, pedagogy and curriculum remain shaped by teachers' deficit perceptions of student's inability to learn and to conduct themselves in an 'appropriate' manner.

The purpose of the BTCNTC research and intervention project, which commenced in February 2006, is the improvement of student performance and engagement, as a consequence of teachers' improving capacity to plan and teach. Developing teacher capacities in responding to the particularities of teaching NT students—their strengths, cultural resources, specific pedagogical needs—their facility to plan and teach and collaborate to sustain ongoing professional is highlighted. During its first phase, a team

consisting of three principal researchers, four research assistants or associates, and a project manager have mentored participating teachers through a twelve week module on curriculum design and assessment with intensive individual and small, discipline-based group mentoring. This module provides participating NT teachers with the professional knowledge and skills to design and facilitate effective curriculum and assessment using *Understanding by Design* (Wiggins & McTighe, 2005). Participating teachers learn and practically apply the concept of "backward design" in planning and enhancing their instructional process so as to achieve desired results in student learning. Working specifically within the NT classroom and curriculum, this module helps teachers clarify learning goals, devise assessments that reveal student understanding, and craft engaging learning activities. Throughout the course, each teacher works closely with a member of the research team and their peers to review and iteratively improve their unit/lesson designs to meet UbD design standards. Working in small disciplinary groups, teacher participants collaborate on planning units of study and developing a wider repertoire of assessment and instructional practices. As participants become proficient in curriculum design and assessment, they assist new teachers entering the intervention. Regular communication is maintained with the schools as to the project's progress. Presently working in five Singaporean schools, the project asks teachers to initially share their planning, curricular design, and assessment practices while participating in the module.

While participating teachers are involved with the module and mentoring, the intervention and research team collects baseline data: student artifacts, classroom observations, teacher interviews and recordings, and field notes of module lessons and other meetings. The intervention project's effectiveness will be determined through measures of the improvement in student understanding as seen in student work. Alignment between the data collected (samples of student work, teacher interviews, student background data, classroom practices coding—adapted and improved from the Core One Singapore Coding Scheme (Luke, Cazden, Lin, & Freebody, 2005), teacher planning/preparation materials, assessment instruments, student performance, and collaboration models) and six research frames through a process of moderation to find "articulations of understanding" will serve as evidence of change. Specifically, educators and other interested members of the community are invited to review data sets and co-construct, in a systematic manner, the criteria and evidence of student understanding. This external moderation method has been used elsewhere to develop confidence in data analysis. The first articulation exercise was recently concluded. A follow-up is planned later in the second year of the intervention and research project.

The intervention's effectiveness will be gauged in positive changes in student engagement through self report, teacher assessment, observed time on task, quality of work. Transcripts are being coded for changes in teachers' discourse regarding the curriculum and their work as curriculum designers that reflect a focus on the importance of students' understanding; changes in the framing and classification of pedagogy in these classrooms that reflect greater variety in classroom talk, tasks, activities and experiences; changes in how teachers' discourse about assessment and their assessment practices that appreciate formative forms of assessment and summative assessment better aligned to the curriculum through backward design; changes in the variety of assessment tools; changes in teachers' discourse about NT students away from 'deficit' discourses. Success will also be determined

by teachers' sustained commitment to curricular design through ongoing collaborations with colleagues and the spread of collaborative curricular design to other schools.

Our initial and very tentative research findings are:

1. Teachers in the project still vary considerably in their commitment to even daily planning, let alone to curricular design. Some teachers' inability to see the utility of planning may reflect a weak sense of professionalism. This may be systemic in Singaporean schools. The project will continue to encourage teachers to take greater agency and responsibility for student learning.
2. Those teachers in the project experimenting with backward design in planning and assessment are achieving success. They have shared these with their colleagues and seem committed to developing their capacity to do effective planning and assessment in the next year of the project. Some report use UbD in their (higher) Normal Academic and Express stream classes.
3. Student work appears to exhibit only marginal evidence of understanding as determined through the first articulation exercise.
4. Teachers' assessment practices remain limited as found in the Core One data. Assessment is not well aligned with either curricular goals in the syllabus or what is taught in units of study.
5. An effective strategy for convincing teachers of the merits of becoming more reflexive about pedagogy and curricular design in particular has come about by demonstrating these misalignments in their own teaching.
6. Teachers' work remains focused on the system-wide assessments such that student work and tests in secondary one are presently shaped in conformity to items on the N Levels in secondary four. These items are likely to be taught and re-taught several times over the intervening secondary grades. While the module introduced a variety of formative and summative assessments to these teachers, more will have to be done to work against the enchantment of current testing regimes.
7. While NT classrooms are very heterogeneous in terms of students' engagement and ability, most teachers in the project still do little to differentiate instruction.
8. Skilful classroom management varies significantly among the participating teachers.
9. Despite recent systemic reforms in Singapore, some teachers feel they have little capacity to change because of institutional demands on their time.

Comparing capacity across "mature" and "emergent" educational systems

Capacity issues figure in different ways and levels across educational reform contexts. This section provides a conceptual framework for thinking about educational change in order to compare how the metaphor of capacity is being employed in "mature" and "emergent" educational systems.

Conceptualising educational change requires a systems thinking approach, for teacher change in itself lies within a non-mechanistic combination of personal, social and contextual conditions (Hoban, 2002). To this end, we find Ingvarson's (2002, p. 4) framing of the discourse of educational capacity building at the 3 levels of individual teacher, school and profession below useful:

Figure 1
PROFESSIONAL LEARNING CAPACITY

The 3 levels work in concert with one another to produce the outcome of student learning, which is the objective of most educational reform or change. At the individual level, pre-service and professional development focuses on the relationship between teacher capacity and student learning outcomes. As teachers are at the frontlines of change, this is the level at which most capacity-building strategies in education today operate. In the United States, ensuring highly qualified teachers is fast joining the ranks of standards, testing, accountability and market mechanisms as a primary policy instrument for educational reform (Murphy & Datnow, 2003). Even though opinions are divided on how best to develop teacher quality and effectiveness, traditional models of professional development there and elsewhere tend to focus on expanding the teachers' repertoire of well-defined classroom practice. In this regard, the Singaporean BTCNTC intervention project conforms to usual practice. However, it does include dimensions of teachers' capacity beyond the usual behavioural skills and knowledge of subject matter, curriculum, students, and general and subject-specific pedagogy in its consideration of the attitudinal dimensions of how teachers' dispositions and views of self change over the course of the project (O'Day, Goertz, & Floden, 1995). The teachers' attitudes toward the low-stream students, expectations for their achievement, and beliefs on their self-efficacy are critical components for the success of the project and the individual journeys we document are non-linear and differ from teacher to teacher depending on embodied resources and the dispositions they had to begin with.

An individual teacher's capacity to accomplish the goals set out by new reform standards depends not only on his/her personal capacity, but perhaps even more importantly on the resources present within the context where they teach (O'Day, Goertz, & Floden, 1995). Hence, at the school level, capacity for educational change depends on the teachers' ability to form a community of practice and leadership that in large part determines the professional culture of the school. In Hong Kong as in North America, research has shown that the influence of principals' leadership behaviour on teachers' sense of efficacy is shown to be significant (Hipp, 1997; Yu, Leithwood, & Jantzi, 2002). Lines of communication between them need to remain open. Without the understanding that there is such close interdependence between individual and organizational/school capacities, an all-

encompassing capacity metaphor may be limited in its tendency to locate the problem within the individual.

In addition to the two dimensions of school capacity relating to the collective commitment and cultural norms impacting the effective participation of teachers in educational change identified by Ingvarson above, O'Day, Goertz, & Floden (1995) suggest organizational structures and management or "school restructuring" as another factor to be worked on, but their research shows that this may suffice as a means to realizing the goals of reform rather than being an end goal in itself. New structures should be changed as and when necessary to remove barriers to educational improvement. Individual teachers would also have to contend with the time, material, fiscal and state-imposed constraints of the school in negotiating the optimal level of their work environment.

Nevertheless, Smylie, Miretzky, and Konkol (2004) are strong advocates of improving the teacher workforce at the level of the school. They argue that teacher development is fundamentally a problem and function of school organization, which has to manage teachers individually and collectively as human resources. Using case studies of three elementary schools produced under the Consortium for Policy Research in Education at the University of Pennsylvania (Elmore, Peterson, & McCarthey, 1996), they compared how these schools "restructured" to meet a common vision of teaching practice and found that the school that achieved the greatest depth and consistency of intellectually ambitious teaching and learning went further than the others in the strategic development of its faculty (p. 57). But schools also need external input and assistance to move significantly beyond entrenched practices. To this end, they may import ideas from national standards and partner with university academics and researchers to inject new ideas and act as conduits for external resources. Finally, in a similar advocacy to view teacher development collectively as a workforce as Symlie and Miretzky (2004), Ingvarson (2002) argues for the building of capacity at the level of the teaching profession, which, he argues, is the most neglected level. At this level, four elements enter the picture:

1. The capacity to build strong normative structures in the profession that provide teacher leaderships and standards from entry to highly accomplished teaching across the profession;
2. The capacity to provide a credible professional certification, based on a rigorous system for assessing teacher performance in relation to standards;
3. The capacity to develop a new infrastructure to support professional development toward standards for each career stage;
4. The development of new career structures and pay systems that provide incentives for professional development and tangible recognition of professional certification. (p. 4)

In the mature educational system of the U.S., these are emerging as the central elements of state and national policies to build teacher quality (National Commission on Teaching and America's Future, 1997; Wilson, 2002; Berry, 2002; Meadows and Knapp, 2002).

Alternatively, in developing countries such as Pakistan, there are conceptual and contextual problems inhibiting teachers' dispositions towards capacity for development, revealed as a gap between theory and practices in teacher education (Mohammad, 2004). In Hong Kong,

the future of schooling is seen to be dependent on the role of the political process in articulating a clear vision (Kennedy, Chun, & Fairbrother, 2004). While in Colombia, capacity building through in-service is an important determinant in the way teachers approach the implementation of multi-grade schools, but a great deal of the unexplained variance in teacher practice is attributed to individual teacher motivation and commitment (Benveniste & McEwan, 2000). And in Namibia, policy-making that is not empirically-based and divorced from classroom realities resulted in unsuccessful reform implementation because the expectations were beyond teachers' capacity (O'Sullivan, 2002).

Conclusion

The metaphor of capacity frames strategies for educational reform across both mature and emerging educational systems. Different systems are differently constrained at the 3 levels identified by Ingvarson. Whereas the mature educational systems have got the "bricks and mortars" more or less in place, the emerging systems are still struggling with the basics of putting pre-service and in-service structures in place (Colombia, Pakistan). Singapore has a well-established teacher-training college in the form of the National Institute of Education which takes care of much of the professional certification, strong governance in the shape of the Ministry of Education who makes policy informed by evidence gathered by the recently-established CRPP, and new career structures and pay systems that provide incentives for teachers are continuously being updated. With the strong sense of urgency to roll out educational reform and the financial resources to carry this through, despite its success in international education comparisons, Singapore may yet be regarded as a still "emergent" system. Our project, likewise, points to both the anxieties of countries with mature education systems to remain competitive against the exigencies of late-capitalist economics and the needs of emergent countries to adequately prepare a knowledgeable and motivated professional teacher practitioner cohort.

Yet, this comparison only reinforces the pervasiveness of the teacher capacity metaphor. In this paper we have tried to work at the edges of the dominant paradigm of human capital still evident in capacity discourse. It seems hard to escape, given that our research is for the most part policy driven by a government wed to neo-liberal visions of world and the metaphor's dominance in public and academic discourse. Perhaps adopting a new metaphor, such as 'capabilities' as suggested by Robeyns (2006), may check the more utilitarian assumptions latent in the capacity metaphor. Perhaps it might help us avoid personalizing what could be perceived as teachers' failings and better appreciate the structural impediments that thwart the intervention's goals. As well, perhaps reframing the project as capability enhancement might help us nuance both how and what we ascertain as professional growth and change and better understand the 'functionings' of practitioner doing and being.

This remains to be seen.

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