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Chapter 5

Empowering Partnerships for School-based Innovation Scale and Sustainability

Azilawati Jamaludin, Yancy Toh and David Wei-Loong Hung

In this chapter, we share the importance of partnerships among schools, families, and communities as a means for supporting students' purposeful learning. Within the context of Singapore schools, we found that efforts to create and sustain school partnerships are not only facing accountability pressures arising from high stakes testing where discretionary time for public educators is a scarce and dwindling resource, but also by the need to innovate teaching and learning in response to the many demands of future uncertainties. In addressing the latter issues, we are clear that collaborative partnership work must be carefully designed to yield visible and valued benefits for mutual parties and, more importantly, to ensure that they are benefits to the school system. In this chapter, we describe the partnership design strategies that are embedded in the practical enactments of a school-based transformative education agenda in Singapore. Through a case example of a Singapore secondary school, we share a partnership model that focuses on not only empowering the school in terms of its development of school-based innovations leading to purposeful learning but also the scale and sustainability of these innovations beyond its initial context of development, to 'partnering' schools on these innovations that move towards life-long, life-wide, life-deep and life-wise learning. We also discuss future directions to empirically advance the empowering partnership model.

INTRODUCTION

Partnering relationships are characterised by the endeavours of involving stakeholders working together toward mutually desirable goals that are unattainable in the absence of cooperation (Hargreaves & Fullan, 1998; Keith, 1999). In the context of education, the nature of these relationships can be described as the “connections between schools and community individuals, organisations, and businesses that are forged to promote students’ social, emotional, physical, and intellectual development” (Sanders, 2001, p. 20) through a bidirectional “flow of information and products across mutual boundaries” (Campbell, Steenbarger, Smith, & Stucky, 1980, p. 2). While partnerships entail variability in terms of degrees of collaboration and power differentials among partnering entities, resonating partnership denominators would include community involvement, collaborative activities, liaisons, and interactions across school–community relations that may include individuals in organisations such as educational institutions, businesses, government and military organisations, cultural organisations, and recreational facilities (Epstein, 1995; Sanders, 2001; Wohlstetter, Malloy, Smith, & Hentschke, 2003). For large-scale school improvement initiatives, partnerships may also extend to include parental involvement, community engagement or school-university partnerships (Hargreaves & Shirley, 2012).

In fact, Giddens (1998) highlighted that partnership and its relation to performance formed the core thrust of educational change advocacies where he delineated the importance of establishing creative combinations of public, private, and voluntary solutions to social problems through what he called ‘structural pluralism’. Specifically, Giddens argued for what he termed the third way in finding the right balance of top-down and bottom-up initiatives, as well as partnerships among different public, private, nonprofit, and voluntary provider. For instance, translation of the third way approach was observed in closely specified “Adequate Early Years” indicators in the United States and system wide literacy targets in England and in Ontario (Hargreaves & Shirley, 2012). Specificity in education objectives and greater oversight towards student achievement levels were manifested through, for example, league tables printed in

newspapers and digital media informing the public about student achievement results; opportunities afforded to parents in underachieving schools to transfer their children to better performing schools; and a heightened focus on encouraging educators to build lateral learning networks to drive change against a backdrop of public's open access to information about teacher quality and student achievement levels.

In true third way fashion, these top-down measures were paralleled by and combined with extensive bottom-up and lateral supports which included considerable emphasis on capacity building, where successful practices are networked across schools and where “underperforming schools are encouraged to seek government support teams and higher-achieving peers when their performance sags” (Hargreaves & Shirley, 2012, p. 17). Significantly, the energy for change emerges from the partnership relations and the pluralism of systemic interactions from the public and the profession, seeding greater stakeholders' engagement with and participation in the development as well as the implementation of educational change policies. In this chapter, we attempt to characterise the partnership design and interaction strategies that are embedded in the practical enactments of a school-based transformative education agenda in Singapore. Specifically, through a case example of National Secondary School (NSS), our research sought to unpack the systemic interactions between NSS and its various ecological entities against a unique centralised-decentralised education system in Singapore, aiming to lay out a possible ‘theory of action’ for scalable and sustainable school-based transformative change.

CONTEXTUAL BACKGROUND OF THE SINGAPORE EDUCATION SYSTEM

An economic downturn in 1987 propelled the need for Singapore to restructure not only its economy into knowledge-intensive industries but so too its education system that has all along “focused on efficiency and standardisation, with a premium on examination success” (Gopinathan & Mardiana, 2013, p. 23). Recognising the need for flexibility in providing learners with multiple pathways of education in the light of economic

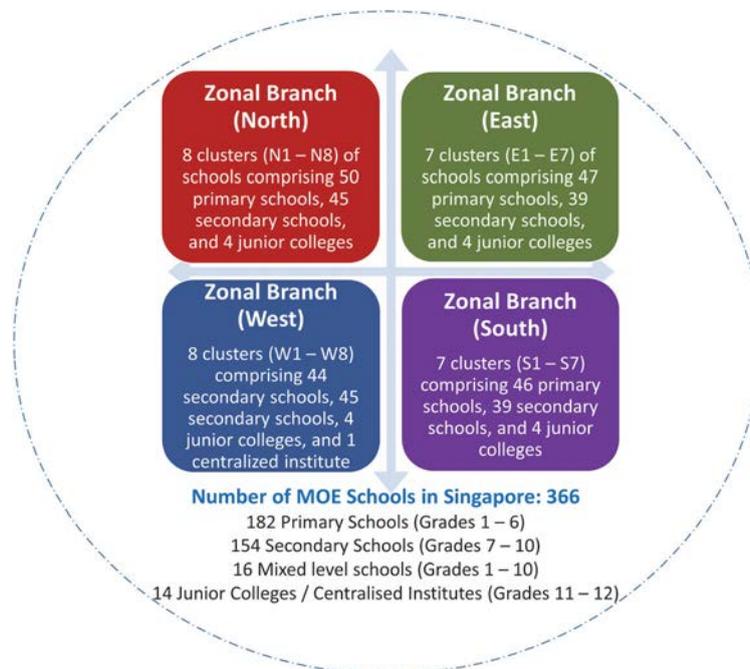
demands for innovative, creative, entrepreneurial and problem-solving skills, the process of decentralisation, reified through increasing autonomy at the school level, were introduced to achieve the desired outcomes of education (see Table 1).

Table 1: The Key Stage Outcomes of Education (MOE, 2015)

At the end of Primary school, pupils should:	At the end of Secondary school, students should:	At the end of Post-Secondary education, students should:
be able to distinguish right from wrong	have moral integrity	have moral courage to stand up for what is right
know their strengths and areas for growth	believe in their abilities and be able to adapt to change	be resilient in the face of adversity
be able to cooperate, share and care for others	be able to work in teams and show empathy for others	be able to collaborate across cultures and be socially responsible
have a lively curiosity about things	be creative and have an inquiring mind	be innovative and enterprising
be able to think for and express themselves confidently	be able to appreciate diverse views and communicate effectively	be able to think critically and communicate persuasively
take pride in their work	take responsibility for their own learning	be purposeful in pursuit of excellence
have healthy habits and an awareness of the arts	enjoy physical activities and appreciate the arts	pursue a healthy lifestyle and have an appreciation for aesthetics
know and love Singapore	believe in Singapore and understand what matters to Singapore	be proud to be Singaporeans and understand Singapore in relation to the world

In 1988, to enable pedagogic maneuverability, MOE initiated a pilot scheme to give greater school autonomy at the school level to nine leading schools. This pilot led to the establishment of the autonomous school scheme in 1994. In 1997, MOE also created the cluster school system. Schools were further grouped into clusters based on 4 geographical zones called zonal branches (see Figure 1).

Figure 1: Zonal and Cluster Organisation of all Singapore Schools (Primary, Secondary, Junior Colleges, Institutes)



Within each zonal branch, schools were organised into about 7–8 clusters. Each cluster has about 11–13 schools that includes a mix of primary schools, secondary schools, and junior colleges. With a view to raising the capacity of the leadership teams and the level of performance in each school, a cluster superintendent was attached to every cluster to facilitate networking, sharing and collaboration among the member schools within the cluster (MOE, 2015). Each school zonal branch further oversees the management of the schools within their purview, in

terms of personnel development and facilitating projects and activities oriented towards overarching desired outcomes of education.

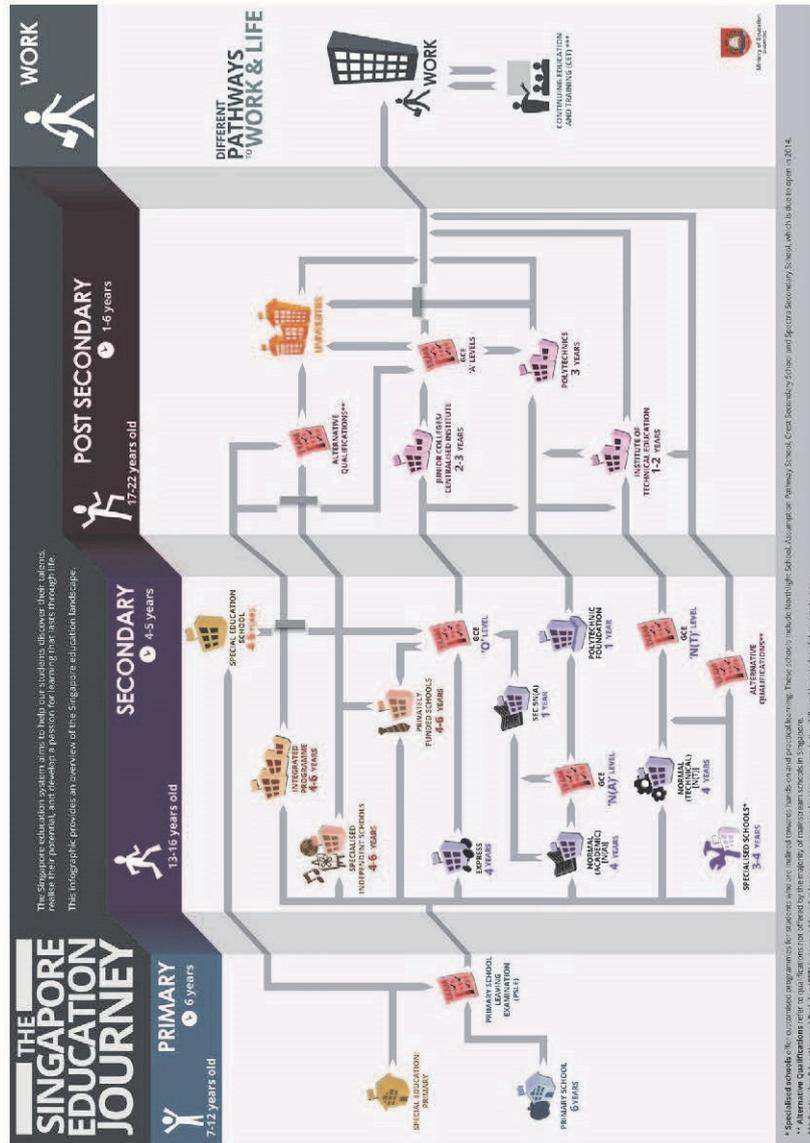
In a bid to move from efficiency and standardisation to an 'ability-driven' system, a 'Thinking Schools, Learning Nation' (TSLN) policy initiative was introduced in 1997 where the then Prime Minister of Singapore (Goh, 1997) called for Singapore's education institutions to respond to the knowledge economy by using, creating, critiquing and applying knowledge rather than showing off mastery of content in examinations (Koh, 2013). TSLN led to a "veritable hurricane of reform initiatives in Singapore schools (Deng & Gopinathan, 2003, p. 51).

In 2004, the 'Teach Less, Learn More' (TLLM) initiative was further launched heralding Singapore's Ministry of Education (MOE) commitment "to an ambitious program of pedagogical reform in Singapore schools in anticipation of the kind of institutional challenges — particularly those in increasingly globalised labor markets — that young Singaporeans are likely to face in the coming decades" (Hogan & Gopinathan, 2008, p. 369). Since TSLN and TLLM, profound changes have then been introduced to the structure of Singapore education with a view of affording flexibility, "pathways and bridges" (Ng, 2009, p. 2) for students across the educational ability spectrum. For example, the proliferation of pathways and bridges included access built into higher levels of schooling as well as into different trajectories of specialised schools (Gopinathan & Mardiana, 2013). (see Figure 2).

Most notably, the shift from an industrialised economy to a globalising economy has led to education reform policies that place strong emphasis on transforming attitudes to knowledge and pedagogy (TSLN, TLLM), strengthening citizenship (National Education), and leveraging on the power of information and communications technology (IT Masterplans) to meet the desired outcomes of 21st century education^a. Yet against these centralised thrusts of the education system, there is system flexibility at

^a Singapore's MOE 21st century education and student outcomes framework can be found at <http://www.moe.gov.sg/education/21cc/>

Figure 2: The Singapore Education Journey: Different Pathways to Work and Life (MOE, 2015)



the ground levels with the increased autonomy given to schools to engage in decision-making 'de-centrally', in response to their own pedagogic needs. Within this vein, schools have the latitude to make curriculum adaptations and innovations within their local context as long as those approaches were aligned and consistent with the overall intent of the overarching education policies, characterising a centralised-decentralisation approach of the system (Chua, 2014).

As aptly analysed by Hargreaves & Shirley (2012), while Singapore has a centralised education system characterised by a universal teacher-training program, and a strong focus on data-driven external accountability, yet the country also embraces localised innovation and application of technology, personalised learning, and holistic education. To this end, in operationalising the enactments of the reform policies at the school level, various research interventions and curricular innovations, such as inquiry based learning mediated by technologies, have been introduced in classrooms (Hung, Jamaludin, & Toh, 2015). An example of such an intervention is a cluster-based digital learning trails project which, within a context of the third MOE ICT Masterplan (MP3) initiative (Ministry of Education, 2008), aligns its research objectives with key thrusts of MP3, particularly self-directed learning, collaborative learning, and authenticity in learning facilitated by technology-enhanced mobile learning opportunities (Jamaludin & Hung, 2016).

A RICH CULTURE OF SCHOOL-BASED INNOVATIONS

Our case school, NSS, has a rich culture of being at the forefront in harnessing information technology to bring about positive learning outcomes for students. The historical trajectory of NSS may be traced back to its rapid growth since 1996 where it was awarded an Autonomous School^b status. Recognised as an Information and

^b Autonomous schools have more autonomy as compared to other government-run secondary schools to plan their own curriculum and activities. However, such schools may charge a nominal miscellaneous fee on top of the regular school fees paid by all students attending government-run secondary schools.

Communications Technology (ICT) enriched school, NSS became a demonstration school, enabling the resources necessary for infrastructure and equipment, professional development and expertise needed to explore and develop innovative use of technology in teaching and learning. In 1999, NSS was selected as a FASTTrack School, seeding the development of numerous learning objects and rich-media content for teaching and learning in the classrooms. In 2004, the school was further selected as a Backpack.NET initiative wherein each Grade 7 student possesses her own tablet PC. Further downstream, in 2007, the school was selected as one of the pioneer FutureSchools@Singapore^c program. Additionally, during the 2007 Global Leaders Forum, the school was also declared as a Microsoft mentor school for schools of the future around the world. In terms of infrastructural entailments, the entire campus is wirelessly enabled, affording students mobility in learning and teachers' expansion of teaching scope beyond traditional structures, into new spaces outside the classrooms.

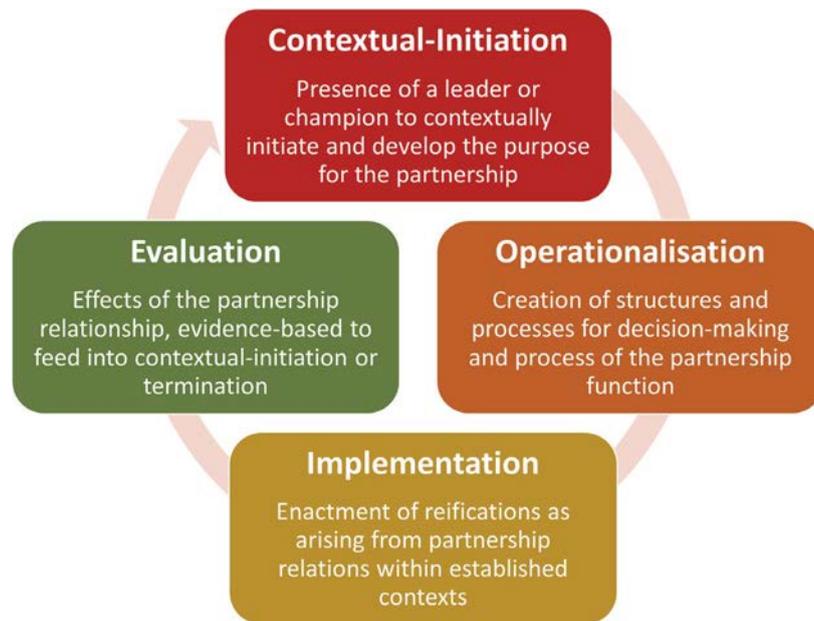
In this chapter, partnering relationships in terms of developing meaningful and innovative content and in aiding the development of innovative IT applications were traced against NSS' historical trajectory. The historical journey of implementing learning journeys through trails began in 2008 at NSS, as part of their holistic student assessment endeavour. In 2011, NSS worked with a technology partner to develop a digital platform for learning trails in keeping up with their status as a school-designate for leading technology-enhanced teaching and learning. Developing the learning trails platform jointly with education technology vendor, Starlight (a pseudonym), NSS identified limitations of the toolkit in terms of its portability (across platforms) and customisation capabilities. In 2012, NSS attained funding from one of the education ministry's funding body (eduLab 2015) as it proposed a 'scale-up' plan of further refining the design of the learning trails toolkit while simultaneously collaborating with ten other schools within its designated

^c FutureSchools in Singapore are distinguished by their capacity to leverage infocomm technologies and innovative school designs to enable efficient administrative practices and innovative school-wide educational programmes to bring about engaged learning for students.

cluster on the use of digital learning trails. In this chapter, we refer to this funded collaboration as the Cluster Innovation project (CIP).

Within the CIP, each of the 11 participating schools (6 primary schools and 5 secondary schools) had the autonomy to implement the use of the innovation within their respective schools in response to their pedagogic needs. For example, in NSS, the digital learning trails innovation was interwoven within the curriculum as part of their interdisciplinary learning pedagogy, while in Concorde Secondary, it was used in subjects such as Elements of Business Skills (EBS). The CIP took place over a period of 2 years and involved 68 teachers and more than 1700 students from the 11 schools, within the cluster structure. While the CIP facilitated the spread of the learning trails toolkit from its use at NSS to the ten cluster schools and beyond, we analysed the related school programs and activities organised by NSS that may bear upon the scale, spread, and sustainability of the innovation. Observed to be underpinned by key principles of mutuality (mutual gains and benefits; win-win value proposition), and a strong focus on NSS core business' in teaching and learning, we found that NSS' relationship with its partners take on a similarly developmental trajectory (see Figure 3) that moves across cyclical phases of initiation to evaluation. In the next section, we seek to unpack how forming partnerships and alliances is an effective means for school improvement in the context of Singapore education and its intrinsic structures, such as the cluster organisation. Specifically we explicate NSS' model of spreading and sustaining its school-based innovations and show how it is unique and effective in our Singapore context in terms of benefitting both itself and other schools, not just within its cluster but so too beyond.

Figure 3: NSS' Trajectory of Partnering Relationships



METHOD AND DATA COLLECTION

We employed a mixed methods approach in tracing how NSS operationalised the CIP by analysing and understanding the scale, spread, and sustainability of the innovation from varied perspectives (Teddlie and Tashakkori 2003). We focused particularly on the underlying partnership mechanisms which facilitated the innovation implementation. We interviewed key leadership personnel, participating teachers, and teacher aides. In addition, the research team participated in the out-of-classroom learning trails that were designed by teachers and students themselves to attain the experiential perspective of learning through this mode. We took field notes and corroborated insights gained from observations. As researchers participated in the experiential learning trails, we recorded conversational data with participants of the trails to form a more coherent analysis of the analytical case study. We transcribed verbatim the interview data which were audio-recorded. We

distilled the salient themes for the analysis. In addition, apart from data collection at NSS, we also sought to compare and corroborate analytical data with two of NSS' cluster member schools.

CASE ILLUSTRATION OF EMPOWERING PARTNERSHIPS IN A SINGAPORE SCHOOL

Stage 1: Contextual Initiation

Against a rapidly changing global landscape, technological advancements, school ICT readiness and the maturity of technological teaching and learning (T&L) approaches in NSS, we first observed the importance of leadership practices that delineate clear vision and goals to help clarify concrete meaning and practical implications for new programs and innovation. Specifically, the school leader plays a key role in initiating a strong contextual initiation grounding and meaningfulness for embarking on a particular innovation project. For instance, while teachers are constantly engaged in conversations about teaching for 'future-readiness', the leadership in NSS engendered a process of 'futuring' that entailed hypothesising a scenario wherein should high-stakes examinations (i.e., the national GCE 'O' levels at the end of Year 10) be removed, how may the future of the school be "imagined". This 'futuring' was premised on a resonant recognition that teachers' grappling with high stake examination often feel "shackled" by its demands.

Research has shown that attempts towards innovation typically wither out as 'stronger' structural constraints such as high-stakes exam take precedence in typically tried and tested traditional pedagogies (Peurach and Glazer, 2011). Thus, by initiating a (hypothetical) context of a landscape free of the 'psychological shackles' of high-stakes exams, the school leader was able to initiate and incite various out-of-the-box ideas from the teachers. The various ideas and scenarios were then converged into a meaningful strategic plan for the school, serving as a backdrop to situate the new programs and innovations to be introduced.

As part of the strategic planning process, NSS was able to identify six strategic idea strands. Subsequently, these idea strands converged into what is termed as a trilogy of strategic thrusts for the school. The three ‘trilogical’ thrusts were: Information and Communications Technology (ICT), 21st Century Competencies (21CC), and Character and Citizenship Education (CCE), converging on a single desired outcome, that is, educating “leaders and ladies” of the 21st century.

Partnership: Importance of a Shared Vision

Enacting change in a school begins with a shared vision that is collaboratively developed by stakeholders which include not just the leadership and teachers within the school, but also community members to reflect mutual aspirations for children’s education and development (Charvis, 1995). The foundation for change must proceed in a manner that is responsive to the values and life circumstances of the surrounding community (Comer, 1984). In the case of NSS, the emergence of a vision underpinned by the trilogic thrusts of ICT, 21CC and CCE were not top-down leadership mandates for teachers. Rather it emerged from a generative process of ideas development amongst the teachers themselves. These thrusts were also communicated to other community members such as parents and other key stakeholders, who may serve as para-educators, and who are seen as ‘partners’ to the educational goal in achieving a shared vision. We found that a compelling and inclusive vision is critical in facilitating the steering of the directional trajectory for a school, binding it together and drawing the best people to work on it. For NSS, reform priorities are first, reified by the trilogic thrusts, building on the school’s prior ‘track record’ with ICT innovations, and second, using the thrusts as the contextual backdrop for which the school’s reform agenda and its operationalisation proceed.

We observed that NSS’ growth trajectory has been characterised by various waves of technology, from IT demo school to 1:1 computing to mobile devices and, at current time, byte size information and digital media ubiquity. Leveraging on its infrastructural readiness for ICT pervasiveness, NSS has extended the ‘educational’ vision beyond

academics such as literacy and numeracy foci areas towards more process-oriented skills and values-based education, while foregrounding the use of ICT. NSS also recognises itself as a 'lead' school in terms of ICT use and to this end, the school seeks to reach out to other schools, who may be less-ICT oriented, to partner with them on the journey of educational improvement. We found that a partnership fundamentally underpinned by such a common shared and inclusive vision are critical resources for capacity building that delineates goals arising from the shared vision, and more importantly an operational plan to achieve the goals.

Stage 2: Operationalising the Shared Vision

In operationalising the shared vision, NSS focused on a fundamental crux of innovation change, that is, developing teachers' capacity — in relation to the trilogic thrusts. To advance teachers' capabilities in operationalising change, NSS put in place a three-tiered professional development model. At the first tier, all teachers were inducted into ICT programs and/or undergo certification of IT skills to standardise the essential ICT skills necessary to enact the school's vision. At the second tier, a departmental needs analysis was conducted wherein the department head would plan and organise the respective development trajectory towards achieving a shared common vision. This would include customising workshops based on the department's ICT plan wherein ICT coaches would mentor identified teachers (based on needs) in the department. The ICT coaches were also the ones who would conduct the professional development for the staff. The school's focus was on building in-house expertise. This was in contrast with conventional models of teachers' professional development where external IT trainers were usually brought in to conduct training. The third and topmost tier of the professional development model comprised selected ICT champions or leaders, including the ICT head of department, whose focus was to further extend and push the ICT frontiers of NSS. Alleviating unnecessary time and workload taxed on teachers for ICT explorations, this core team functioned as the school's ICT forerunners, tasked with scanning the technology landscape for

identification of meaningful technologies to be integrated with the school's curriculum.

The commitment to ICT improvement was also manifested in the allocation of staff's roles and responsibilities. Contrary to a department being typically headed by 1 head, the school was also one of the few schools in Singapore that dedicated three subject heads to ICT who looks at areas of infrastructure, professional development, and students' development respectively. Additionally, apart from the three officially appointed subject heads, the school also creates an ICT director role whose focus was on special ICT projects that the school organised, such as nationwide digital trails competition. In total, the school has a functional team of about 30 teachers (25% of the school's staff strength) that focused on ICT enactments, over and above their regular teaching and learning responsibilities. The ICT core team was also involved in reaching out to other schools in a bid to share best practices in relation to ICT innovations that had achieved "proof of pedagogical concept" use within the school. Specifically, the ICT leads put in place the CIP that coalesced ten other schools within the same cluster network to begin to experiment and use the digital learning trails innovation that was developed by the school and which had achieved stable use within NSS. The funded project created structures of accountability through school to school collaboration which we explicate further in the implementation phase.

Partnerships within and across Schools — Distributing Experiential Knowledge and Resources towards a Shared Vision

Observed from NSS tiered model, we saw evidence of partnerships outreach that extend beyond (i) (typically) silos departments within a school and (ii) (typically) inward boundaries of individual schools, to outreach to other schools. While the impetus for educational change might have emerged from within the school context, NSS attempted to spread innovation and stimulate learning and change through partnership networks as a fundamental mechanism for overall educational improvement. Amongst the ten cluster schools that were involved in the

CIP, a resonant purpose among them was the commitment to learning and improvement, whilst providing contexts for professional motivation and reduction of inequities. For example, for a cluster school who was less well-resourced in terms of ICT experiential knowledge, NSS provided a mentorship program for the development of ICT leaders that can be mentored by NSS core team of ICT experts. Such a model provided the inspirational leadership in bringing schools together to pursue a common vision despite their differences. There was also a distributed shift towards equity of resources as NSS shares out not just pedagogical experience and knowledge in relation to the digital trails innovation but also ICT equipment necessary to enact the innovation efficaciously. Cluster schools involved in the project were able to draw out mobile devices from NSS should there be limited resources within their own school.

Stage 3: Implementation

NSS adopted a design thinking approach in operationalising the vision contextualised in Stage 1. For any impetus for change to be meaningful, NSS engages in deep levels of needs analysis to identify pertinent problems faced by teachers in terms of ICT curricula needs. At the next level, the core team was engaged in the development of proposed solutions for identified needs. This was an iterative process which involved extensive communication between the core team, school leadership EXCO committee, as well as Key Personnel which included departmental heads. As part of the NSS' trilogy, teachers were provided with a specific context for innovation experimentation. For example, in identifying digital learning trails as a possible solution for place-based learning, authentic and experiential learning, teachers were provided with the relevant development and training in using the innovation trails themselves and henceforth given a period of about three months to prepare for personal sharing on their experiences of tinkering with the innovation as part of the school's E-learning week. Led by their respective departmental KP, teachers worked collaboratively in subject and level teams in preparation for their respective presentations.

How does NSS implement learning trails at a whole school level? Moving forth from teachers' tinkering with the innovation, the ICT core team provided additional support that might be needed by teachers, post experimentation. An interdepartmental partnership across disciplinary departments and between Tier 1, 2, and 3 professional development tiers facilitated such supports to take place. When the innovation was ready to be implemented at the classroom level, the leadership in NSS continued to play an important role in garnering buy-in from staff on the ground. Constantly moving away from positioning innovation implementation as top-down mandates, NSS leadership demonstrated high degrees of cognisance towards supporting teachers not only during classroom implementation of the innovation but also in terms mitigating the restrictive obsession with standardised testing in terms of mitigating through minimising any recourse to students' performance "scores". This was done through acknowledging that implementation of innovations such as the learning trails were integral to teachers' core business of teaching and learning. The collaborative, partnership culture that the leadership managed to put in place in NSS represented one of the strong underpinning factors that is not only supportive but also empowering in the context of innovation implementation. As teachers worked together in implementing the CIP, principles that facilitated the scale and sustainability of the learning trails innovation included (i) inspirational vision that is inclusive and meaningfully compelling, (ii) students' enhanced and value-added learning as priorities that follow the vision, (iii) professional cultures of collaboration, partnerships and trust where peers are mentored and the 'strong help the weak', and (iv) reaching out beyond the school through parallel engagement and empowerment practices with other cluster schools.

Partnerships: Outreach and Implementation to Other Schools

A parallel tiered approach was taken by NSS' in its outreach partnerships with the cluster member schools. On one level, there was the interplay of social interactions between ICT leaders and key personnel within each respective cluster member school. These occurred through collaborative dialogs wherein each school's ICT lead was involved in one of four-

tiered approaches to ensure planning and effective implementation of the project based on a common shared vision of 'exploring technology-enhanced on-the-go learning opportunities'. The four-tiered panel approach (advisory, steering, organising, and working panels) was further broken down into four stages of enactment (planning; implementation; review and reflect; share and celebrate).

NSS worked on promoting a normative commitment among the respective ICT leads, from the ten other schools within the cluster, to goals of 'self-directed, collaborative, and authentic learning' for all students. This goal was in turn aligned to the overarching national agenda of self-directedness, collaboration, and authenticity in learning as communicated in the third ICT Masterplan for learning (Ng, 2009). On a second level, these leaders in turn worked with their respective subject teachers on their plans in the implementation of CIP within their school.

Enacting the operationalisation mechanics of the CIP proceeded on a process efficacy approach wherein well-defined guidelines to be realised within specific time limits were put in place. Each cluster member school was mandated to share their learning experiences at cluster level meeting, and through presentations either at an international or locally organised conference. Each school was expected to produce a learning package on their enacted learning trail that was oriented for "scaling across schools", in terms of developing first level utilisation of the CIP prototype. Educational technology officers (ETOs) from the funding entity also worked closely with both NSS and participating cluster schools, assisting in matters of school implementation. Specifically, the ETOs were instrumental in facilitating innovation related processes such as teacher development and design and implementation of the CIP both within classrooms and out of classroom learning. Delving further, we analysed the CIP's goals for curricular change were generic in nature — aiming at broad strokes of reform across the board rather than targeting specific curriculum areas for change. Moreover, the kinds of changes teachers were expected to make were not formally specified, and instead, each school (and teachers within the respective cluster schools) was directed to 'discover' its most relevant and efficacious means to

producing authentic learning within its own contextual space. Construed this way, schools and teachers were given autonomy in their CIP implementation trajectory, and as a result, there was minimal focus on implementation fidelity.

Partnerships: Parents

A strong ICT orientation and integration into the curriculum necessitated reaching out to parents to achieve buy-in in supporting their child's ICT mediated education. With students' increased accessibility to multiple modes of information, the school acknowledged areas of potential concerns from parents. To mediate these tensions, NSS put in place constant communication channels with parents through not only official modes of interaction (letters, teacher-parent conference etc.) but also through the parent support group. The school also conducted surveys with parents where responses and feedback would receive follow up action. Further to that, cyberwellness workshops were also conducted for parents to enable them to better facilitate their child's ICT usage. Beyond the CIP, other accompanying innovative solutions such as a dynamic homework system also enabled parents to monitor their child's timetabling and homework patterns. The underlying premise of the school-parent relationship was based on a two-way partnership collaboration, that aimed to enlist parents as 'para-educators' in their child's learning journey and that was oriented towards providing a holistic support network, from school to out-of-school (home).

Stage 4: Evaluation

In evaluating the CIP implementation, NSS moved from mere quantitative tracking, towards a more broad-based impact evaluation analysis. This entailed establishing a school level research plan that aligned itself to the overarching school level research agenda. Importantly, NSS leadership highlighted the intentionality of such a structured approach in making it meaningful for teachers, in that the aggregation of teachers' research efforts would fit back into school level research questions.

NSS implemented a Research and Evaluation (R&E) framework that was meant to cyclically feed back into the school's research objectives. For instance, in terms of evaluating students' 21st CC, whilst teachers might design an intervention that focused on knowledge construction, the findings arising from the CIP would be pulled out into a macro level understanding of the overall trajectory of students' 21st century knowledge and meaning making processes in relation to their holistic development. The school also worked closely with collaborative partners (e.g., Stanford Research Institute (SRI)) to develop their own research repertoire in terms of deriving input from SRI for developing research questions, data collection procedures, as well as analytical techniques.

Further, in establishing a new Head of Department (HOD) role for R&E in the school, NSS further strongly signaled its commitment towards teachers' doing research work with a small group of enthused teacher researchers overseeing and being responsible for research processes. The HOD and a small team of teacher researchers mitigated issues of research operationalisation such as conducting literature reviews, data collection, and analytical procedures.

At an overarching level, clear communications and messaging in the form of the trilogy "policy" was constantly articulated within the school. This messaging was not worded in complex language and was articulated in ways that were ear-catching and easy to remember.

A systemic approach to professional development ensured that not every teacher was taxed but that there was a strategy through which a core group coped with the new ICT demands and a later method of equipping the other teachers whose main business was teaching and learning. Leveraging on the 3-tiered model of professional development in NSS, the leadership in NSS acknowledged that although the school had a "self-imposed" mandate to help like-minded schools in their journey towards digital age learning for instance, in the CIP, the actual work on spreading these innovations were not the imperative of all the teachers.

Rather, the school's ethos remained focus on ensuring deep learning for its students, while consolidating diffusion efforts within a nested, selective group of inclined teachers. In this way, whilst the school adhered to MOE's policies of scaling up pedagogical innovations, it balanced this challenge by consolidating efforts internally, attuning itself to the needs of individual teachers on the ground.

The change strategies for deep learning manifested by NSS' leadership (Principal, Heads of Department, Key Personnel) might be emergent and contingent (on ground issues) in nature but importantly the leadership had constantly endeavoured to be the sustained, focused voice of realignment towards the overarching goal of education improvement and a shared vision based on the trilogic thrusts. There was a constant feedback cycle on the impact of innovation implementation that made overt students 'gains'. Importantly, the school's leadership reiterates the importance of a systemic mindset, in understanding that learning was reciprocal and collaborative at both the teachers' and learners' level, that it was unpredictable and interweaved many "agents" within the ecology acting simultaneously. These agents in turn do not 'act' in silos but work in collaborative partnerships in acknowledgement of the importance of aligning their respective school and students' trajectory to find the intrinsic value for sustained growth and improvement. Essentially, it is about initialising, operationalising, implementing and evaluating the impact of innovative changes that is empowering to teaching and learning where the education system as a whole can benefit.

The whole process is summed up as a journey in 'education transformation'. Transformation connotes a deep change process of practices and the schools are socially complex milieus where practices are ingrained against a larger backdrop of not only national policies but so too a broader ecological community. Driven by the impetus to actualise deep future-ready learning, schools are compelled to rethink about teaching and learning. Paying attention to ecological partnerships in areas of leadership, teacher capabilities, pedagogical quality, and infrastructural equity and affordances are key imperatives for sustained change.

CONCLUSION

We postulate that it is important that an empowering partnership model considers the following:

- (i) Contextual-initiation for change, through the presence of leadership that initiates and develops the purposes of partnership,
- (ii) Operationalisation of change, through creating structures and processes for the partnership function, particularly in terms of developing teachers' skills, mind-sets and beliefs,
- (iii) Implementation of change, through enacting partnering relations within the various school, teacher and student contexts, and
- (iv) Evaluation of change, through assessing the effects of the partnership relationship such that the evidence feed back into the contextual-initiation phase.

A scalable and sustainable school improvement agenda entails forming partnership and alliances such as in the case of CIP and its ten cluster schools as an example of one effective means. While the Singapore education system may not be at its optimal level of collaborative formations yet, especially when it comes to forming partnerships in relation to curricular related matters, the CIP project has managed to provide evidence of how the initiatives put in place have benefited both NSS and the participating cluster schools in terms of the use of digital trails innovation for teaching and learning, and in proliferating further the innovation beyond its original school of development.

The CIP is unique in the Singapore school system that affords cluster proximity of schools located within the same geographical location, which potentially can reduce inequities between proximal schools through lateral engagements between leaders, teachers, and students. Ultimately, the point of partnership networks is to empower the spread of innovation, stimulate learning, increase professional motivation and reduced inequities, seeing managed diversity as an integrating strength, and not a dissipating weakness.

In the following chapter, to meet the needs of the 21st century learning and competencies, we know that school leaders will need to maintain a balance and manage the tension between performative (teaching to the test) pedagogies and inquiry-based, student-centred pedagogies. We will share an approach that can mitigate the tension. From our research, we have found that it will be possible to facilitate the diffusion of educational innovations within and across schools by leveraging “leadership from the middle” as the driving force for change. School-to-school networks such as Networked Learning Communities can facilitate communication at all levels and encourage collaboration, sharing and documentation of the educational innovations to initiate epistemic change in teachers’ beliefs, mindsets and agency to work towards purposeful learning that will be life-long, life-wide, life-deep and life-wise.

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