TE21

A Teacher Education Model
for the 21ˢᵗ Century

A Report by the National Institute of Education, Singapore

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ACRONYMS

A	'Awareness' competencies
ACF	Assessment Competencies Framework
AG	Academic Group
ASK	Attitudes Skills and Knowledge
AU	Academic Unit
BB	Blackboard
BA	Bachelor of Arts
BA (Ed)	Bachelor of Arts (Education)
BEd	Bachelor of Education
BSc	Bachelor of Science
BSc (Ed)	Bachelor of Science (Education)
BT	Beginning Teachers
C2015	Curriculum 2015
CARE	Centre for Applied Research in Education
CB	'Capacity Building' competencies
CCA	Co-Curricular Activity
CGPA	Cumulative Grade Point Average
CIP	Community Involvement Projects
CK	Craft Knowledge
CPE	College of Physical Education
CRPP	Centre for Research in Pedagogy and Practice
CS	Curriculum Studies
CT	Cooperating Teachers
DEA	Diploma in Educational Administration
DipEd	Diploma in Education
EdD	Doctor in Education
EL	English Language
EPMS	Enhanced Performance Management System
EPT	Entrance Proficiency Test

ES	Education Studies	P1 - 6	Primary 1 to Primary 6
ESE	Enhanced School Experience	PAL	Programme for Active Learning
FPDE	Further Professional Diploma in Education	PCK	Pedagogy-Content Knowledge
		PE	Physical Education
GESL	Group Endeavours in Service Learning	PEL	Primary English Language
GROW	Growth of Education Officers, through better Recognition, Opportunities and seeing to their Well-being	PERI	Primary Education Review and Implementation
		PGDE	Postgraduate Diploma in Education
GTC	Graduand Teacher Competencies	PhD	Doctor of Philosophy
GTCF	Graduand Teacher Competencies Framework	PIP	Professional Inquiry Project
		PLC	Professional Learning Communities
ICT	Information and Communication Technology	PLIS	Professional Learning Inquiry Sessions
		PNA	Programme for National Awareness
IE	Institute of Education	PRE	Programme Review and Enhancement
IT	Information Technology	PW	Project Work
ITP	Initial Teacher Preparation	QM	Quality Management
JC	Junior College	RD&I	Research, Development & Innovation
LAN	Local Area Network	SAC	Self-Access Centre
LSL	Learning Sciences Laboratory	SCM	School Coordinating Mentor
LTA	Land Transport Authority	SEL	Social and Emotional Learning
MA	Master of Arts	TDC	Teacher Development Centre
MEd	Master of Education	TDD	Training and Development Division, MOE
MLS	Management and Leadership in Schools programme		
		TE	Teacher Education
MOE	Ministry of Education	TLDC	Teachers' Language Development Centre
mp1, 2 & 3	Masterplan for IT in Education (1, 2 & 3)		
		TLLM	Teach Less, Learn More
MSc	Master of Science	TPD	Teacher Professional Development
MTeach	Master of Teaching	TTC	Teachers' Training College
NIE	National Institute of Education	T-P	Theory-Practice
NIE TE[21]	NIE Teacher Education Model for the 21st Century	VSK	Values Skills and Knowledge
		V³SK	Values3 Skills and Knowledge
NSC	NIE Supervision Coordinators		
NTU	Nanyang Technological University		

FOREWORD

I am delighted to be asked to pen this foreword for the National Institute of Education, Singapore's Teacher Education for the 21st Century (TE21) report, the culmination of an institute-wide programme review and enhancement (PRE) process that began in November 2008. I was privileged to have been given a preview of the main recommendations when I recently visited Singapore in late July 2009 to receive the honorary Doctor of Education degree awarded by the Nanyang Technological University (NTU). What struck me most poignantly was the immense amount of work and thinking that has taken place within a relatively short space of time and the coherent manner in which such an ambitious endeavour has been undertaken.

My relationship with NIE, an autonomous institute within NTU, began when I was an appointed member of the International Advisory Panel (IAP) in 2007. At that stage, NIE was in the process of articulating their key strategic directions from 2007-2012 (known as the 3:3:3 Roadmap) guided by their strong vision of becoming an institute of distinction, excelling in teacher education and educational research. TE21 is NIE's transformative endeavour to prepare its student teachers to become 21st century teaching professionals ready to meet the challenges awaiting them in the 21st century classroom.

Singapore represents a nation that sees its future in the knowledge and expertise of its people, taking up the challenge of creating a 21st century education system in a unique tripartite partnership between the Ministry of Education, the country's national institute of education and the schools. Such a tight and strong partnership is the envy of other nations, as it allows research to inform policy and policy, in turn to be translated seamlessly into schools. Teachers' work, while always complicated, is becoming ever more important as the challenges for which they must prepare their students are becoming more complex. This is in large part because the nature of work and the society we live in are changing constantly, and at an increasingly breakneck speed.

Research shows us that exemplary teacher

education programmes possess at least the following attributes: close integration of courses that create a coherent experience throughout the programme, well-defined standards of practices and performance, a core curriculum with emphasis on student learning, assessment and content pedagogy, use of problem-based teaching methods, active assessment using case studies and portfolios, drawing on the best practices of skilled veteran teachers in clinical experiences, and extending the amount of clinical exposure as early as possible in the programme.

The main recommendations outlined in this report clearly hold the potential to achieve these and other features of exemplary teacher education programmes. A particularly important step is the NIE's plan to deepen the theory-practice nexus by strengthening the role of mentorship in the clinical school experience. This will be reinforced by introducing the notion of Professional Learning Inquiry Sessions (PLIS) within the context of Professional Learning Communities. In capitalising on the strong tripartite relationship enjoyed by NIE, MOE and the schools, the Graduand Teacher Competencies (GTC) Framework will serve as an important indicator of what NIE has done in terms of initial teacher preparation and will clarify where the schools need to take over in continuing to build these competencies as teachers progress through their careers. It will also serve as an important indicator of what further professional development teachers need after graduating. The report also recommends a bold and important move toward developing and phasing in portfolio assessments for teachers – what will clearly be a major task for the large cohort of student teachers served by NIE. This demonstrates a significant commitment to the high-quality clinical preparation of future teachers.

Finally, as we have learned throughout decades of school reform, it is of utmost importance, when attempting to reform a system, to enable teachers and organisations to learn to use the new innovations that have been introduced. Otherwise, even the best ideas will fail. Great ideas, without a viable plan for implementation, cannot be sustained. What impresses me most, therefore, is that in the midst of all the recommendations made by this report, there is a clear, carefully articulated implementation plan that can enable the recommendations to be translated into actual changes in programme design and delivery.

I wish NIE great success in this quest to reach yet another peak of excellence in preparing quality teachers with the needed values, skills and knowledge to help improve student learning outcomes in this rapidly changing world.

Professor Linda Darling-Hammond
Charles E Ducommun Professor of Education
Stanford University, USA
Honorary Doctor of Education
Nanyang Technological University, Singapore

Transforming Teacher Education: Achieving the Vision of the 3:3:3 Roadmap

Transforming Teacher Education in the 21st century

PREFACE

Globalisation and the increasing convergence of digital technologies were the defining characteristics of our world at the turn of the 21st Century. As boundaries blurred due to the swiftness of information transfer, knowledge became power. With governments gearing up to prepare their citizens for the knowledge-economy, greater responsibility has been placed on education institutions to meet the challenges brought about by this new landscape.

This outlook is very evident in Singapore, where talent drives our economic success. Education is the main enabler for a nation with no natural resources and whose competitive edge lies in arming its people with skills and competencies needed for the 21st century. But beyond just the economic pursuit of developing individuals as global citizens, the need to preserve national culture, identity and values rooted in family and community is just as important in an increasingly borderless world. This requires an education system that adopts a holistic approach to developing the whole person and his or her full potential.

The National Institute of Education (NIE) as the premier teacher education institute in Singapore since 1950, and as a founding member of the International Alliance of Leading Education Institutes, recognises its crucial responsibility in this national endeavour. Its strategic roadmap from 2007 to 2012 is inspired by a vision of being an institute of distinction renowned for its teaching and research excellence. The **3:3:3 Roadmap** as illustrated in Figure 1 is anchored on the **3 pillars** of *meeting the needs of stakeholders*, *achieving international recognition through educational research,* and *impacting the educational fraternity internationally*. In the **3 core strategy areas** of *Teaching*, *Research* and *Corporate Support*, a range of initiatives have been launched to propel NIE forward towards establishing itself as a world-class provider of teacher education (TE) to serve the needs of educators, both in Singapore and beyond, as well as a centre of excellence and innovation in educational and content research. These strategic thrusts are underpinned by **3 enabling success factors**: *relevance*, *responsiveness* and *quality*.

Two years into the 3:3:3 Roadmap's implementation, the constantly changing educational landscape calls for a timely pause to reflect, review, refresh and recharge the Roadmap. This is after all the essence of continuing success – to remain relevant and responsive to both seismic and subtle shifts. At this juncture, the strategic direction set by the 3:3:3 Roadmap is essentially sound and the master strokes largely intact. But the tactical plan must have that quality of nimbleness and adaptability. Imagine if you will, NIE as an armada braving the vast swelling ocean and its changing currents. The flagship steers its course, but within the fleet there is also an array

of speedier crafts that are able to move faster, manoeuvre their way more deftly and with the flexibility to adapt to transient conditions.

It is now well-recognised that "the most important single factor for the quality of education and thus for the efficiency and quality of the pupils' learning is the quality of the teachers' training."[1] However teaching and research excellence are only as good as their engagement with the latest trends in teacher education, backed by evidence and informed by enlightened policies. The demands placed on teachers in this day and age are high. Teachers have to be equipped to deal with the increasing diversity and changing profile of students within a global and digital landscape. They must continually develop their skills in order to drive change, take on collaborative roles and integrate learning in school systems. Aside from these skill sets, teachers are also tasked to ensure that each student develops holistically as a person in order to actively contribute to society. Recent policy initiatives by the Ministry of Education (MOE) such as the C2015, mp3, PERI must also be addressed by NIE to achieve MOE's refreshed desired outcomes of education.

The **Programme Review and Enhancement (PRE)** initiative is a strategic review process that began at the end of 2008 and is NIE's concrete response to these global challenges and changing national educational needs. It also represents a synergistic approach that takes cognisance of recent MOE policy initiatives. NIE's goal is to enhance and ultimately strengthen its model of teacher education along the whole continuum from initial teacher preparation (ITP) to teacher professional development (TPD). NIE's enhanced and updated teacher education model will drive not only how we support the development of teachers for their roles in the 21st century classrooms, but also how we develop our blueprint for programme innovation, capacity development and institutional renewal to remain at the forefront of teacher education.

The PRE forms the major building block of the Teaching strategy under the 3:3:3 Roadmap 2007 – 2012. Implementation of the recommendations made by the review team will allow us to enhance the structure and substance of our TE model including programme design and delivery, curriculum and pedagogical innovations, and preserve, build and continually develop a culture of great respect for learning. These are the essential factors conducive for the task of preparing a generation of adaptive and global citizens rooted in Singapore. Our model also aims to include more impactful research and organisational improvements to support our teaching initiatives. Moreover, the PRE will involve our valued partners, MOE and schools, as their support is a key enabler to successfully implement our recommendations.

In driving the transformation of teacher education through the PRE, the key principles which guided the development of the 3:3:3 Roadmap were similarly considered. NIE recognises the importance of its tripartite relationship with NTU and MOE as it operates within an academic community while being accountable to Singapore's macro-educational policies. As with the framing of the 3:3:3 Roadmap, NIE embarked on the PRE initiative with a view to strengthening the foundations created by prior successes in teaching, research and strategic partnerships.

Prof Lee Sing Kong
Director, NIE

FIGURE 1 : CONCEPTUAL UNDERPINNINGS OF THE 3:3:3 ROADMAP 2007–2012

Vision	An Institute of Distinction
Mission	Excel in teacher education & educational research
3 Pillars	Achieving international recognition through educational research · Meeting the needs of stakeholders · Impacting the educational fraternity internationally
3 Strategies	TEACHING · RESEARCH · ENABLING CORPORATE SUPPORT
3 Success Factors	Responsiveness · Quality & Excellence · Relevance

Milestones in Teacher Education

Milestones in Teacher Education

Educational Policies and Initiatives

1959-1978
Survival-driven education

1979-1996
Efficiency-driven education

1950
Teachers' Training College (TTC) established. Launches the Certificate in Education for non-graduates

1960
TTC switches to part-time teacher training to cope with demand for teachers

1963
Full-time teacher training re-introduced

1971
TTC launches the Diploma in Education (awarded by the Uni of Singapore) for graduate teachers, as well as post-graduate degrees in education.

1973
- TTC becomes the Institute of Education (IE).
- Part-time Teaching Cadetship scheme launched.

1980
Full-time teacher preparation replaces part-time training schemes.

1984
College of Physical Education (CPE) established at Bukit Timah Campus and offers the two-year Diploma in Physical Education.

1985
Diploma in Educational Administration (DEA) and Further Professional Diploma in Education (FPDE) programmes for the training of school leaders are launched.

1989
First PhD students enrolled

1990
- Postgraduate Diploma in Education (Primary) (PGDE) programme provides pipeline of graduate teachers in primary schools.

1991
- IE and CPE are merged to form National Institute of Education (NIE) as part of NTU. It has 4 Schools: Arts, Science, Education & PE, and a Centre for Applied Research in Education (CARE).
- BA/BSc with Dip Ed programmes introduced.
- Modularization of pre-service and full time in-service programmes initiated.

1992
- Teaching of Computing and Teaching of Computer Applications added to the PGDE progamme.
- Postgraduate programmes leading to the award of Master's and PhD degrees started.

1993
- The pilot "Programme for National Awareness" (PNA) mounted.
- Postgraduate Diploma of Teaching in Higher Education programme and mentoring scheme in the DEA introduced.
-

1994
- NIE switched to the Academic Unit System

TE²¹

NIE

Desired Outcomes of Education

- Ability-driven education (1997-present)
- Thinking Schools, Learning Nations
- Launch of National Education
- Launch of Community Involvement Programme
- 1st Masterplan for ICT in Education (mp1) [1997-2002]

Education Services Review Committee

1995

- Degree programmes modified to prepare secondary school teachers.
- CARE reorganized and renamed NIE Centre for Educational Research (NIECER)
- Principals' Executive Centre established.

1996

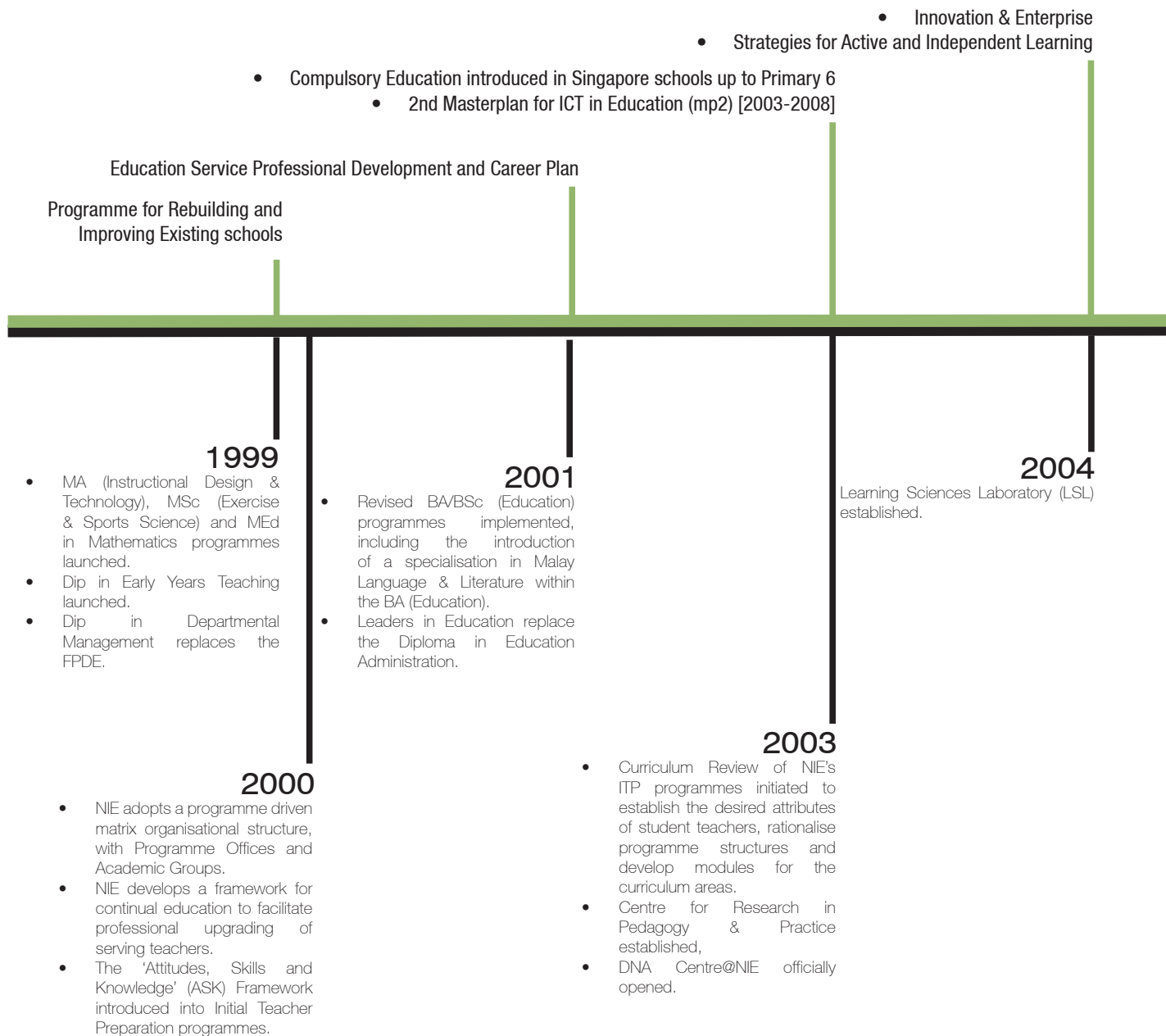- New courses introduced: Dip in Home Economics, Dip in Art Educ.

1997

- MA (Educational Management) and MA (Applied Psychology) programmes launched.
- PNA replaced with the compulsory Programme for National Education
- NIE draws up masterplan for effective infusion and integration of IT in its curricula and includes IT for learning & teaching included in research priorities.
- NIE hosts the 7th International Conference on Thinking.
- Special Training Programme (Mother Tongue) is introduced.

1998

- Degree programme revised to offer separate tracks for primary and secondary teaching.
- Addition of formal programmes leading to advanced professional qualifications, and courses towards the award of in-service diplomas.
- Two new courses are added to the range of formal programmes leading to advanced professional qualifications: Supervisory and Curriculum Management Skills, and Mentoring and Developmental Supervision
- Singapore Centre for Teaching Thinking is established.
- A national review of teacher training system in Singapore prompts NIE to strengthen its role in the provision of foundation training for trainee teachers and their professional upgrading.

Educational Policies and Initiatives

- Innovation & Enterprise
- Strategies for Active and Independent Learning
- Compulsory Education introduced in Singapore schools up to Primary 6
- 2nd Masterplan for ICT in Education (mp2) [2003-2008]

Education Service Professional Development and Career Plan

Programme for Rebuilding and Improving Existing schools

1999
- MA (Instructional Design & Technology), MSc (Exercise & Sports Science) and MEd in Mathematics programmes launched.
- Dip in Early Years Teaching launched.
- Dip in Departmental Management replaces the FPDE.

2000
- NIE adopts a programme driven matrix organisational structure, with Programme Offices and Academic Groups.
- NIE develops a framework for continual education to facilitate professional upgrading of serving teachers.
- The 'Attitudes, Skills and Knowledge' (ASK) Framework introduced into Initial Teacher Preparation programmes.

2001
- Revised BA/BSc (Education) programmes implemented, including the introduction of a specialisation in Malay Language & Literature within the BA (Education).
- Leaders in Education replace the Diploma in Education Administration.

2003
- Curriculum Review of NIE's ITP programmes initiated to establish the desired attributes of student teachers, rationalise programme structures and develop modules for the curriculum areas.
- Centre for Research in Pedagogy & Practice established,
- DNA Centre@NIE officially opened.

2004
Learning Sciences Laboratory (LSL) established.

NIE

Growth of Education Officers, through better
Recognition, Opportunities and seeing to their
Well-being (GROW 1.0)

- Enhancing National Education – Head, Heart,
  Hands framework
- GROW 2.0
  - Primary Education Review and Implementation Committee (PERI)
    - 3rd Masterplan for ICT in Education (mp3)
    - Developing the Next Generation Team

- Teach Less Learn More (TLLM)
- Social and Emotional Learning (SEL)
- Strategies for Effective Engagement
  and Development of pupils in
  primary schools
  - Programme for School-based
    Excellence in primary schools

Curriculum 2015 (C2015)

2005

- The 'Values, Skills and Knowledge' (VSK) Framework replaces ASK in Initial Teacher Preparation programmes.
- Professional Development Continuum Model launched.
- Master in Educational Administration launched.
- Group Endeavours in Service Learning (GESL) is included in the curriculum for all ITP student teachers.

2006

- Doctor of Education (EdD) Dual Award by NIE and Institute of Education, University of London launched.
- Master of Education in Curriculum and Teaching launched.
- NIE holds its first e-Learning week.

2007

- NIE's 3:3:3 Roadmap established to guide NIE's development for the next 5 years.
- International Advisory Panel endorses the 3:3:3 Roadmap.
- NIE's Strategic Research, Development and Innovation (RD&I) Programme outlines its research priorities for 2008-2012.
- Management and Leadership in Schools Programme (MLS) launched.
- International Alliance of Leading Education Institutes established with NIE as inaugural chair.

2008

- Temasek Foundation-NIE Leaders and Educators in Asia Programme launched.
- First intake of in-service Diploma in Physical Education.
- New programmes launched: MEd (Developmental Psychology), MA (Counselling and Guidance) and BEd (Primary).
- An e-learning (blended learning) mode is used for the newly introduced part-time BEd programme.
- Dean's Commendation for Research introduced.
- Translational Development Unit within LSL established.
- Office of Education Research established.
- NIE's Programme Review and Enhancement 08/09 (PRE) Initiative launched.
- New programmes developed to cater to niche areas special needs, JC track and Educational Psychology.
- Joint recruitment exercise with MOE for MOE International Teaching Awards.
- Centre for International Comparative Studies initiated.

2009

- BSc in Sport Science and Management is launched.
- Office of Academic Quality Management (OAQM) is established.
- NIE TE21 Programme is launched – implementing recommendations of the PRE 08/09.

Executive
Summary

Executive
Summary

NIE as a university-based teacher education institution has a strong foundation in terms of the structure and substance of its teacher education programmes. Like many high-performing teacher education providers in the world, NIE's model provides the theoretical foundation to produce the "thinking teacher" whilst concurrently having strong partnerships with key stakeholders and the schools to ensure strong clinical practice and to inject the reality of professionalism in teacher development. Our strength also lies in a strong base in subject matter and pedagogical content knowledge, as well as a strong connection to educational research. The adoption of the university-based model demonstrates that teaching is a profession, where the development of teachers is underpinned by evidenced-based learning, and where teachers require the award of a degree as a pre-requisite for joining the profession.

Previous reviews have affirmed both the structure and substance of NIE's teacher education programmes. In the light of changing needs in Singapore's education system and developments in the global educational landscape, this current review builds on existing strengths to bring teacher education to a higher plane of excellence, drawing on the perspectives of stakeholders and putting the 21st century learner at the very heart of our educational goals. '*21st century learners call for 21st century teachers*' is the impetus for the Programme Review and Enhancement (PRE) 2008-2009. Based on extensive literature review, understanding of existing and emerging trends, local profile, changing landscape in policies and initiatives, and research data, we explored possible and viable avenues for enhancements – the culmination of these efforts is a new **Model of Teacher Education for the 21st Century (TE21)** at NIE.

The NIE TE[21] is a transformative endeavour that will guide the design, delivery and evaluation of NIE's programmes in order to provide the best education to our aspiring and serving teachers to become 21st century teaching professionals. It is a key initiative under the teaching strategy of the NIE 3:3:3 Roadmap (the 5-Year Strategic Plan 2007 – 2012) and a concrete response to the educational challenges brought forth by the current global landscape as well as anticipated future needs. Thus far, the 21st century has been characterised by knowledge-driven economies, rapid information exchanges and fast-moving communication technologies which have created new demands on education systems worldwide. In the 21st century landscape, education must focus on nurturing the whole child – morally, intellectually, physically, socially and aesthetically. Students need to acquire new knowledge, skills and dispositions to ensure their survival and success as individuals, as members of the community, and as citizens of our nation. To achieve this, we must develop teachers who are able to undertake

greater responsibilities as they are at the forefront of educating our youth. It is now universally accepted that the quality of the teaching force determines the quality of education. As we raise the standards for our children, our 21st century teachers will also need the right values, skills and knowledge to be effective practitioners who will bring about the desired outcomes of education.

Enhanced Partnership with MOE and Schools

The robust partnership between NIE, MOE and schools is a key driver of NIE's internationally recognized teacher education programmes. To strengthen the tripartite relationship along the whole continuum and reinforce the theory-practice nexus, NIE advocates an "Enhanced Partnership Model" to leverage on the proven strengths of NIE's university-based approach while emphasising much closer collaboration with MOE and schools than what currently exists.

The commitment from all key stakeholders – NIE, MOE and schools is required in transforming teacher education to produce 21st century teachers. The Enhanced Partnership Model is one of the key levers that will determine the successful implementation of the proposed TE21 recommendations. This model provides the collaborative framework of shared values and goals in the interest of teacher learning and education research, while recognising the need for mutual respect for each partner's roles, beliefs, perspectives, experiences, expertise and knowledge. The enhanced partnership between NIE and schools is particularly significant in strengthening the theory-practice nexus. Together with MOE, a strong tripartite relationship will promote solidarity of intentions and efforts to provide teachers with the best support for their work in 21st century classrooms.

TE21 : Towards a strong teaching force for the 21st century

The new TE21 Model puts forward six broad recommendations (R1 to R6 referred to below) that are intended to enhance the key elements of teacher education, including the underpinning philosophy, curriculum, desired outcomes for our teachers, and academic pathways. These enhancements reflect a holistic approach to strengthening teacher education at NIE across the continuum, from ITP to TPD in a manner that is current, relevant and responsive in meeting the needs of our schools.

R1 : New Values[3], Skills and Knowledge (V³SK) Model

The V³SK represents the underpinning philosophy of teacher education at NIE. It guides the design, delivery, and enhancement of NIE's programmes and courses, to develop teachers who possess the positive attitudes, necessary skills, and depth and breadth of content knowledge. These are the essential pre-requisites in meeting the challenges of the 21st century classroom. The V³SK model focuses on three value paradigms: Learner-centred, Teacher Identity and Service to the Profession and Community. Learner-centred values puts the learner at the centre of teachers' work, requiring awareness of learner development and diversity, believing that all youths can learn, caring for the learner, striving for scholarship in content teaching, knowing how people learn best, and learning to design the best learning environment possible. Teacher identity values refers to having high standards and a strong drive to learn in view of the rapid changes in the education milieu, and being responsive to student needs. The values of service to the profession and community focuses on teachers' commitment to their profession through active collaborations with the fraternity and striving to become better practitioners to benefit the community.

The V³SK model also underscores the requisite knowledge and skills that teachers must possess in light of the latest global trends and to improve student outcomes.

R2 : Graduand Teacher Competencies (GTC) Framework

The GTC Framework articulates a set of professional standards, benchmarks and goals for NIE graduands. The **GTCF**, which outlines the 21st century skills, is a holistic integration of the revised V³SK model and the MOE competencies framework for beginning teachers (BT), using three performance dimensions – *professional practice, leadership & management and personal effectiveness.* By aligning the GTCs with the professional standards set by MOE, a common language will be established and graduands will continue to develop these competencies beyond ITP. The GTCF will be embedded in NIE's programmes and courses, and will also be used in evaluating student teacher outcomes. It provides mentors with a good developmental framework to work with, and student teachers with a common baseline to work towards. It also serves as a scaffold that supports student teachers' growth and development. Finally, the framework provides clear expectations for stakeholders in terms of the competencies of NIE graduands.

R3: Strengthening the Theory-Practice Nexus

The theory-practice (T-P) gap is widely accepted as a prevalent shortcoming of teacher education programmes. There is a need to achieve balance between theoretical knowledge and practice-based learning. A strengthened T-P nexus in teacher education programmes allows teachers to leverage on both types of learning to effectively transition to schools. The more common approaches of bridging this gap are through reflection, experiential learning, school-based research or inquiry projects and pedagogical tools that bring the classroom into the university. NIE will undertake a number of initiatives to further strengthen the T-P relationship in its programmes taking cognisance of these approaches:

- The mentorship process will be strengthened, particularly in practicum and beyond, and through greater infusion of NIE-school interactions. Mentorship in both the ITP and BT induction periods will be reinforced by establishing a Structured Mentorship Preparation Programme to equip School Coordinating Mentors (SCMs) and prepare them for their enhanced roles and responsibilities. The programme will take a developmental approach with Basic, Intermediate and Advanced levels.

- The practicum will be strengthened by enhancing the current role of the SCMs before, during and after the practicum and ensuring a continuum of mentorship from practicum to the BT induction period. Professional Learning Inquiry Sessions (PLIS) to be led by SCMs will be introduced as a component of the practicum.

- NIE-School interactions will be infused in NIE's programmes on the basis of the four common approaches of bridging the T-P gap – reflection in action, school-based inquiry or research, using pedagogical tools to create a 'simulated' school environment and experiential learning. The interactions will be done in a more systematic and meaningful manner at both the course and programme levels.

- NIE will explore with MOE the secondment of practitioners from schools to NIE, especially those who have the potential to be SCMs. They will be attached to NIE to teach ITP and TPD courses as part of their professional development.

- The Enhanced School Experience (ESE) for PGDE will be structured to allow student teachers to fully benefit from it. The ESE will provide student teachers with an induction to the school culture and environment, opportunities to observe experienced teachers and to co-teach, as well as provide a structure for observing and reflecting on these experiences. These activities will optimise the time spent in schools with key takeaways that will directly benefit them during the course of the programme in NIE.

- The Reflective Teaching Model will be used to provide a common framework to help teachers consolidate their experiences and guide them in systematically reflecting on their practices. SCMs will also be exposed to the model which can be used during PLIS and the new Portfolio assessment approach.

A new phase of partnership between NIE, MOE and schools is timely as the Teacher Track has made significant advancement in recent years, and a sizeable number of Senior Teachers and Master Teachers have been appointed and trained. Riding on the crest of this more mature system, schools are in a good position to take on a bigger, more active role in the mentoring of student teachers before, during and after practicum, and beginning teachers during the induction period. This transformation will call for a new customised mentor training programme by NIE, and refinement of the practicum process with the introduction of PLIS. There will be deeper engagement of professional practice involving SCMs, and greater emphasis on reflective teaching.

R4: Programme Refinements and An Extended Pedagogical Repertoire

It is acknowledged that teacher education programmes need dynamic development to establish both important core as well as the most up-to-date content. Therefore a mechanism for greater sharing and articulation needs to be put in place. There is also an increased recognition of the changing nature of content – in terms of accessibility, advancement and conditions for bringing about new learning. Hence the recommendation by the review task force is to incorporate programmatic changes where relevant. At the same time, pedagogies and assessments need to change, given the changing nature of knowledge, learning, profile of learners and the new environment.

NIE will establish a strategy and framework for Pedagogies to ensure that appropriate and effective pedagogies are used in the curriculum, with the objective of equipping teachers with the instructional strategies needed for classroom teaching. In modelling best practices for teachers to translate into classroom practices, NIE will also ensure that effective pedagogies are scaled up across the institute, and will invest in creating teaching facilities that support pedagogical approaches which can help achieve the desired teaching and learning outcomes.

R5: Assessment Framework for 21st Century Teaching and Learning

Enhancements to assessment practices will complement the range of pedagogies to be adopted in NIE. The establishment of an Assessment Framework for teaching and learning will address the need for producing teachers who have high assessment literacies and who are able to adopt the best practices in the classroom in order to effectively evaluate student outcomes. Under this framework, key processes that will that enable both NIE educators and teachers to adopt innovative assessment practices *as*, *of* and *for* learning will be identified and scaled up.

A defined set of assessment literacy outcomes to be developed will consist of key elements of assessment competencies for effective teaching and learning in school. By specifying entry-level requirements, the framework supports the concept of learning as a continuum that begins in an ITP setting and continues with life-long professional education and experience.

The introduction of *e-portfolios* is a move in a new direction and approach to the assessment and validation of graduates' achievement of the GTCs, and is aimed at developing the reflective teacher. For ITP, the assessment focuses on the development of student teachers from the start of their candidature in NIE through to the end of the practicum. For TPD, a professional portfolio will be one of the key components of assessment for the Professional Inquiry Project (PIP), which is a graduation requirement for the new Master of Teaching degree.

R6: Enhanced Pathways for Professional Development

To attract the best and brightest to make teaching a profession of choice, the stature and professionalism of teachers will need to be improved. To this end, two new academic learning pathways are being proposed to enable highly qualified student teachers to obtain a Master's degree within a shorter timeframe.

NIE will be using a staged approach for any proposed implementation of the following pathways:

- 2-year full time PGDE-Master's programme

- 4+1 accelerated Bachelor-Master's programme for the top 10% of the cohort

Transforming for the 21st Century – Walking the Talk

The success of the NIE TE[21] Model ultimately lies in the effective implementation of the recommendations put forward and the sustainable impact of any programme innovations and new developments in curriculum, pedagogies, and assessment. To gear up for the transformation process ahead, NIE as a community has to turn inwards and reflect on the necessary change of mindsets, approaches, systems and technologies that are required to turn best intentions into action, and achieve a concerted synergy of excellence across the institute. This institutional change has to be achieved through the following initiatives:

- Evidence-based, research-informed improvements to teaching and learning

- Academic Quality Management

- Faculty professional development

- Infrastructure and systems to support learning

This transformative endeavour where *21st century teachers call for 21st century teacher educators* requires strong reserves of self belief, supported by the appropriate resources to reach the destination 2012 as mapped out by the 3:3:3 Roadmap.
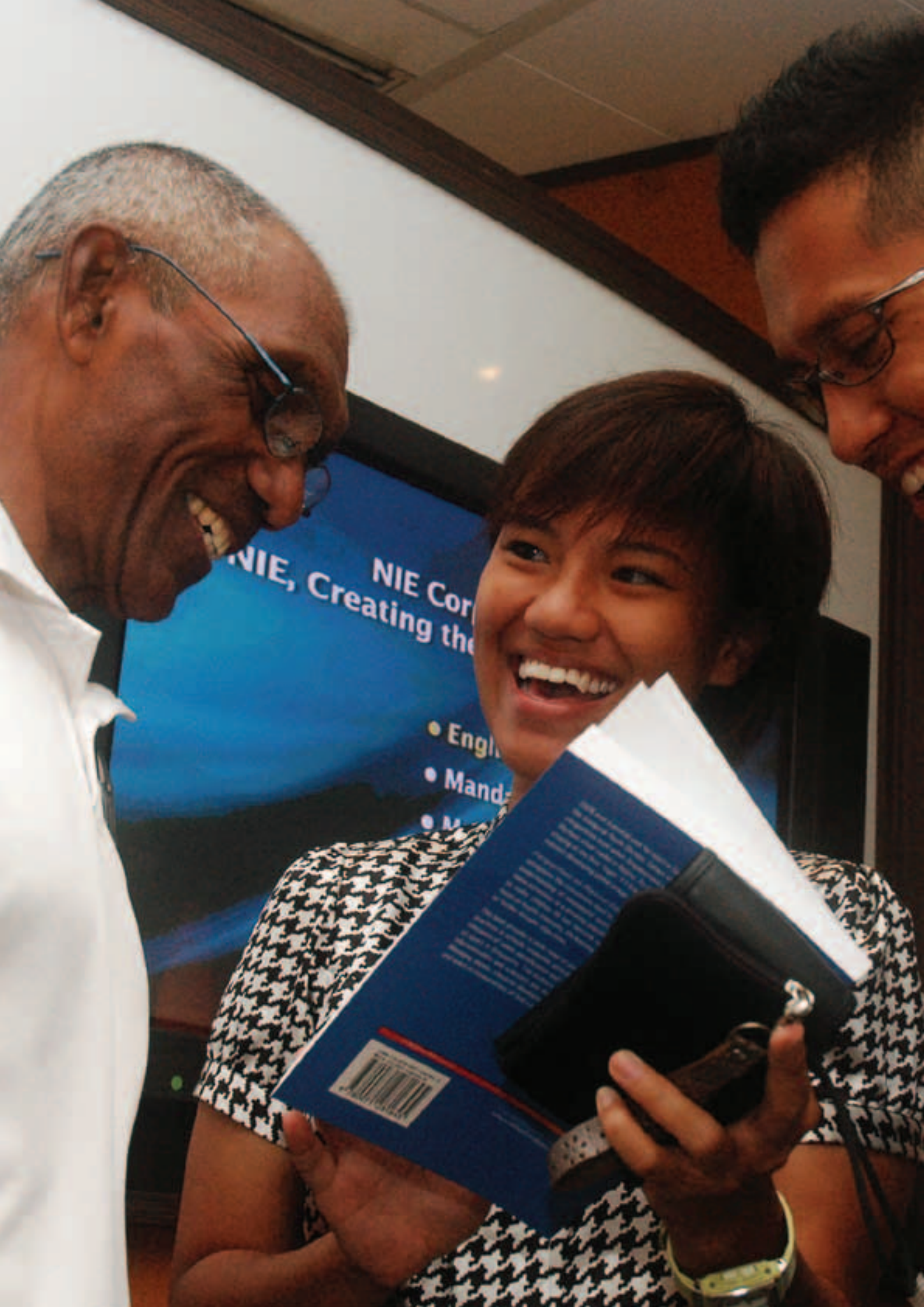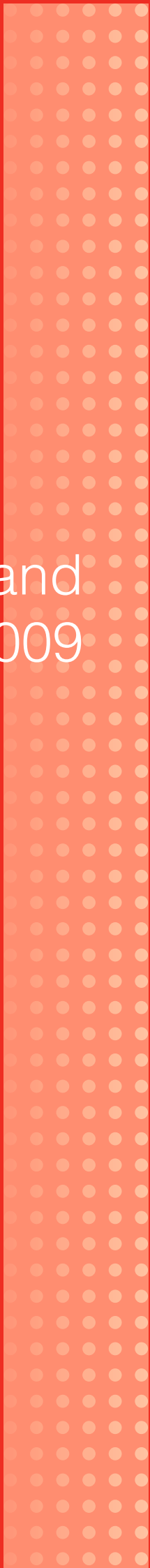
Programme Review and Enhancement 2008 - 2009

Programme Review and Enhancement 2008 - 2009

The new millennium has been characterised by unprecedented breakthroughs in knowledge and technology. 21st century challenges have called for new paradigms and "maps" of engagements in all spheres of life. Education in particular, continues to play a pivotal role in ensuring national and global survival and growth.

Internationally, all the debates and research in education have as its corollary the emerging consensus that teacher quality is one of the most, if not the most significant factor for student learning, achievement and educational improvement. Evidence points to the preparation, induction and continuous development of teachers as being imperative to achieving that quality. The verdict is clear: attract the best, shape them to be the best and continuously develop them to give their best once they enter the schools.[2]

In Singapore, the precedence of goal congruence amongst leaders in educational policies and teacher education provides the foundation for the translation of responses and initiatives into productive changes. The developments at MOE as regulator and policy maker, and NIE as a university-based teacher education institute, have concurred and aligned in the reviews on the changes needed to effect learning for student teachers and teachers in service. In 2008 – 2009, policy and programme initiatives by MOE have been accompanied concurrently by realignments in the way NIE delivers teacher education along the entire continuum from initial teacher preparation (ITP) to teacher professional development (TPD). This proactive approach to programme development and implementation can be further systematised through deeper cooperation between NIE and the schools.

The ultimate beneficiaries of NIE's responsiveness to the changes in the teacher education landscape will be the students in the schools who will be equipped with the necessary knowledge and skills needed for the 21st century. NIE's central role in Teacher Education (TE) is about preparing and continually developing quality teachers. It is therefore imperative that we ensure that the education we offer is based on the needs of students in improving their learning outcomes and cultivating the right values that will underpin their success in this global age.

The purpose of education is to nurture the **whole child** – morally, intellectually, physically, socially and aesthetically. The key stakeholders in the education service have the responsibility to educate our children, to equip them with the requisite skills and knowledge, as well as the values and attitudes to ensure their survival and success as individuals, as members of the community, and as citizens of our nation. In recognising the key developments in a child's life, it is necessary to effectively establish strong foundations in language, mathematics,

emotional intelligence and diligence, as well as develop their conscience at an early age. Moving on to the next stage - the age of discovery and identity, children must be guided towards realising their kinaesthetic and academic potential, possessing the necessary life skills and learning to be independent. At the stage of establishing their life vision and aspirations, children need to have established values as they begin considering their career goals and learning to live interdependently with others in the community.

To achieve these worthy goals for our children requires an excellent education system, which is now widely recognized as being determined by the quality of teachers. Ultimately, a teacher with a strong sense of professionalism performs well by helping students achieve the desired outcomes of education which meet academic, governmental and societal expectations. This is the underpinning philosophy which has guided the Programme Review and Enhancement (PRE) process. It reflects Singapore's investment in giving our future generations the best possible teachers and the best start to their formal education.

In nurturing each child to optimise their potential, teachers need to have a firm grasp of their knowledge discipline as well as to possess the pedagogical skill sets for classroom teaching. The aim of teacher education is to build capacity and enable teachers to adapt to the different educational environments. The focus of this capacity development encompasses attributes, values, instincts, life skills, mental models and competencies that lead to desirable student outcomes. Moreover, teacher learning must also be contextualized within complex relationships involving the 'local learning infrastructure' such as culture, structures and operational parameters. It should be seen as a continual process, where teacher learning begins from ITP and continues through TPD. The programmes offered in NIE spanning the continuum of TE which includes diploma, degree, PGDE, Master's, PhD and EdD, as well as in-service and leadership programmes, offer a concrete means of building the capacity of our teachers to prepare them for school as beginning teachers, as well as to value add to their experiences as serving educators. A robust and dynamic teacher education model that infuses all these elements while responding to MOE's policy initiatives will ensure high calibre teachers in our schools.

It is in this light that NIE has embarked at this timely juncture on a comprehensive review and enhancement of its teacher education programmes. This will ensure that our TE programmes are designed to equip the teacher population in Singapore to meet challenges they are likely to face in our 21st century school system. In addition, NIE as part of NTU is working in tandem to enhance its education programmes in view of the recommendations

of the Blue Ribbon Commission.

The **Programme Review and Enhancement (PRE) 2008-2009** initiative is a consolidated undertaking involving the Foundation Programmes, Graduate Programmes and Research, Education Research Offices and the Academic Groups in a strategic effort to enhance teacher education in Singapore and beyond. The review process has been undertaken in close partnership with our key stakeholders, including MOE and the schools. The PRE was driven by a Steering Committee chaired by Director/ NIE, with the following objectives:

(i) To review the Teacher Education model at NIE, from initial teacher preparation through to teacher professional development

(ii) To study the educational landscape both locally and internationally so as to meet and anticipate the changing needs of our local and global stakeholders

(iii) To re-examine the Values, Skills & Knowledge (VSK) desired attributes framework in order to align with 21st century literacies and skills, and MOE's refreshed Desired Outcomes of Education framework

(iv) To explore the degree of relevance, responsiveness, quality and excellence of our Teacher Education programmes for the purpose of nurturing and continually supporting teachers professionally to meet the challenges of 21st century classroom and the global environment

(v) To explore ways to strengthen our partnership with MOE and schools in the provision of teacher education and strengthen the theory-practice linkages

(vi) To draw upon results of international educational research and state-of–the-art knowledge to inform teacher education

(vii) To review NIE's staffing structure and capacity to support new implementations following this review.

Strategic Re-alignments to Achieve Holism in Teacher Education

The PRE process was considered in a holistic manner, incorporating the perspectives of the key stakeholders in NIE's TE continuum. One of the key drivers which the review is cognisant of is the need to respond to the ongoing diversification of the school system, which has been in play since 1997 in a conscious attempt to move away from the 'one-size-fits-all' framework. The objective is to cater to differentiated learners who may

require different approaches to help them realise their full potential academically or otherwise. The evidence for such divergence is seen through the establishment of different types of schools – independent, international government-aided and specialist schools. There is also an ongoing diversification of academic pathways which veer away from the standard GCE 'O' and 'A' Level qualifications. Examples include the Integrated Programme (IP) which allows students in selected schools to by-pass the 'O' levels and directly sit for the 'A' levels while the International Baccalaureate (IB) Diploma is increasingly being offered as an accepted local university admission qualification in place of the 'A' levels. The system also adopts the pluralism of merit mindset where schools are also encouraged to grow their own niches outside academic excellence.

There has also been a great deal of consonance with MOE's recent initiative to develop a new framework for Teacher Professional Development. Furthermore, NIE's recent body of research data has given a richer understanding of how teachers presently teach. Among other things, research data on Singapore schools appears to suggest that:

- teachers need a stronger dose of PCK (Pedagogical-Content-Knowledge);
- teachers need a deeper understanding of the nature of the disciplines they teach;
- teachers need to develop capacity to initiate their students into the knowledge and practice of the discipline;
- teachers need a sophisticated understanding of the fundamentals of lesson planning, questioning and feedback, capacity for differentiated instruction, strategies for effective peer work and inquiry approaches.

Together these main drivers point towards key areas where a re-think of the content and pedagogy we employ is necessary for us to be able to produce teachers with 21st century skills, who are equipped in all aspects to guide the 21st century student. This entails that NIE TE programmes encapsulate the requirements of the 21st century skills sets and key development areas for students (Table 1). These in turn have to be aligned to the developmental needs of 21st century teachers (Table 2).

TABLE 1: 21ST CENTURY SKILL SETS AND KEY DEVELOPMENT AREAS FOR STUDENTS[3]

Learning and Innovation Skills	- Critical Thinking and Problem Solving - Creativity and Innovation - Oral and Written Communications
Knowledge, Information, Media and Technology Literacy Skills	- Content Mastery - Information Literacy - Media Literacy - ICT Literacy
Life Skills	- Flexibility and Adaptability - Initiative and Self-Direction - Teamwork and Collaboration - Social and Cross-Cultural Skills - Productivity and Accountability - Leadership and Responsibility
Citizenship Skills	- Valuing of Diversity - Global Awareness - Ecological and Environmental Awareness - Values, Ethics and Professionalism

Areas	Main considerations
21st Century Literacies	**Information Literacies and Knowledge Building** Teachers must be able to guide their students in accessing information through various electronic and print sources efficiently, in evaluating information critically, and using information accurately and creatively. In the new knowledge based economy, teachers should also help develop in their students the capacity for building knowledge based on validated information. In other words, beyond gaining understanding of existing information, students should also develop the ability to rise above using existing information to generate better ideas. **Media** Teachers should be adept in using multiple media, such as text, video, audio, and animation to facilitate effective teaching and learning. Advances in digital technologies have integrated multiple media using graphical and interactive interfaces. This necessitates new literacies to decipher, interpret and communicate using visual imagery such as icons, as well as new man-machine interactive modes such as the technology used in touch-screen handphones and interactive whiteboards. **Multicultural** Multicultural literacy involves the knowledge of cultures and languages, as well as the ways in which multi-sensory data (text, sound, and graphics) integrate language, subject matter and visual content. As teachers today live in diverse societies and teach in diverse settings, multicultural literacy presents a meta-framework with the potential for integration across curricula.
21st Century Learning Environment	Teachers must be able to support learning communities that enable students to collaborate, share best practices, and integrate 21st century skills into classroom practice. This in turn will enable students to learn in relevant, real world contexts (e.g. through project-based or applied work). Teachers should also be able to provide access to quality learning tools, technologies and resources, expanding the learning environment to community and international settings, both face-to-face as well as online.
21st Century Curriculum and Instruction	Research shows that effective instruction in 21st century needs to take on an integrated approach, helping students understand how to access, evaluate, synthesize, and contribute to information. The focus is on providing opportunities for applying these skills across content areas and for a competency-based approach to learning. The teaching and learning opportunities support innovative pedagogies to integrate the use of technologies, inquiry and problem-based approaches and higher order thinking skills.

A key outcome of the PRE initiative will be to achieve stronger alignment of our TE   programmes to ensure that Singapore's 21st century teachers have the desired attributes to respond to the needs of the 21st century student.   Another key outcome for NIE specifically is the incorporation of locally-generated evidence from our Centre for Research in Pedagogy & Practice (CRPP) and Learning Sciences Laboratory (LSL) into any programmatic change in our TE offerings. This involves a commitment by NIE to "walk the talk" in terms of adopting new pedagogies and embracing new localised insights into the factors driving teacher learning and teaching excellence.

A Teacher Education Model for the 21st Century (TE²¹)

A Teacher Education Model for the 21ˢᵗ Century (TE²¹)

In Singapore, the quality of teacher education is premised on both its structure and substance – a university-based model with strong emphasis on professionalism that is evidenced by a strong clinical practice component. NIE's Teacher Education Model for the 21ˢᵗ century (TE²¹) comprises various components unified by the overarching purpose of equipping teachers with competencies that will enable them to respond proactively to the responsibilities of the classroom and the school. The TE²¹ Model applies to the entire spectrum of teacher education from the stage of initial teacher preparation through to the continuing journey of teacher professional development. (Figure 2)

21ˢᵗ century learners call for 21ˢᵗ century teachers. Therefore the **21ˢᵗ century Learner** is at the heart of our teacher education goals. We believe that each child should be nurtured to optimise their moral, intellectual, social and aesthetic potential. The preparation and development of teachers is not an end in itself but a step towards achieving the desired outcomes for students in our schools. The **Values, Skills and Knowledge Framework** serves as a key guiding principle which ensures that teacher learning from ITP through to TPD is supported by a foundation of skills and knowledge, which in turn is securely bound by a set of core values.

Pathways that reflect a holistic TE continuum provide the various points of entry to a wide repertoire of programmes which enable teachers to make informed decisions about learning options so as to achieve their academic and professional aspirations. Teacher learning is a continuous process and because of changing educational, societal and technological factors, teachers must be given timely and appropriate opportunities at every stage of their careers to upgrade and develop their professional capacities.

NIE offers diploma, degree, higher degree and other in-service **programmes** under its two programme offices. These are geared towards preparing future educators and further developing the capacities of serving teachers. The various programmes cater to a wide gamut of disciplines that parallel those taught in our schools while specific learning objectives are embodied in the curriculum of each course. NIE **curricula** are designed to offer a holistic learning experience, with focus on content knowledge, pedagogical skills for teaching specific subjects, communication skills as well as emphasising the psychology, philosophy, and sociology of education.

The **theory-practice nexus and institutional frameworks for transforming pedagogies and assessment** are essential elements of teacher learning that drive programme and curriculum development and innovation. The various approaches applied towards strengthening the theory-practice nexus helps teachers

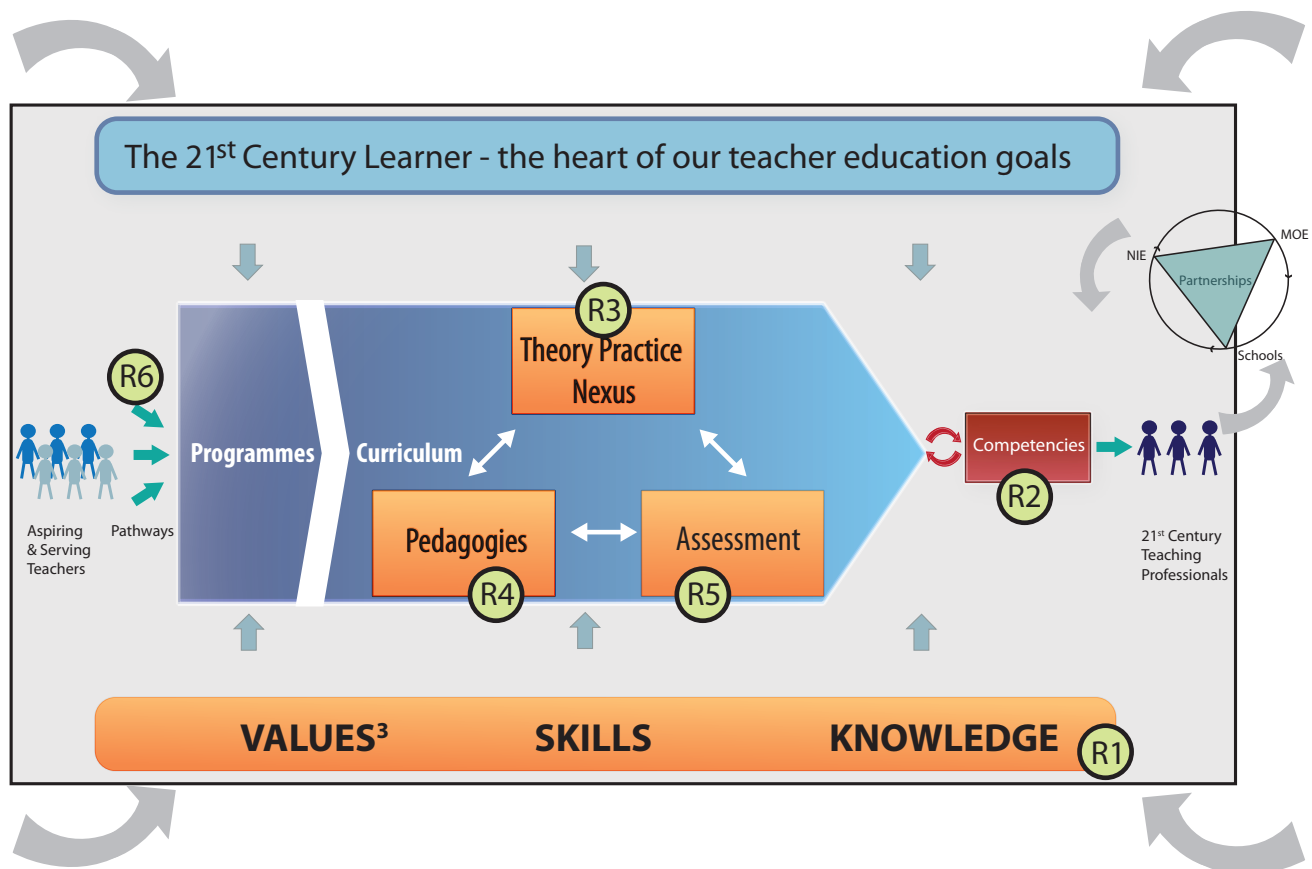Figure 2: NIE Teacher Education Model for the 21st Century (TE21)
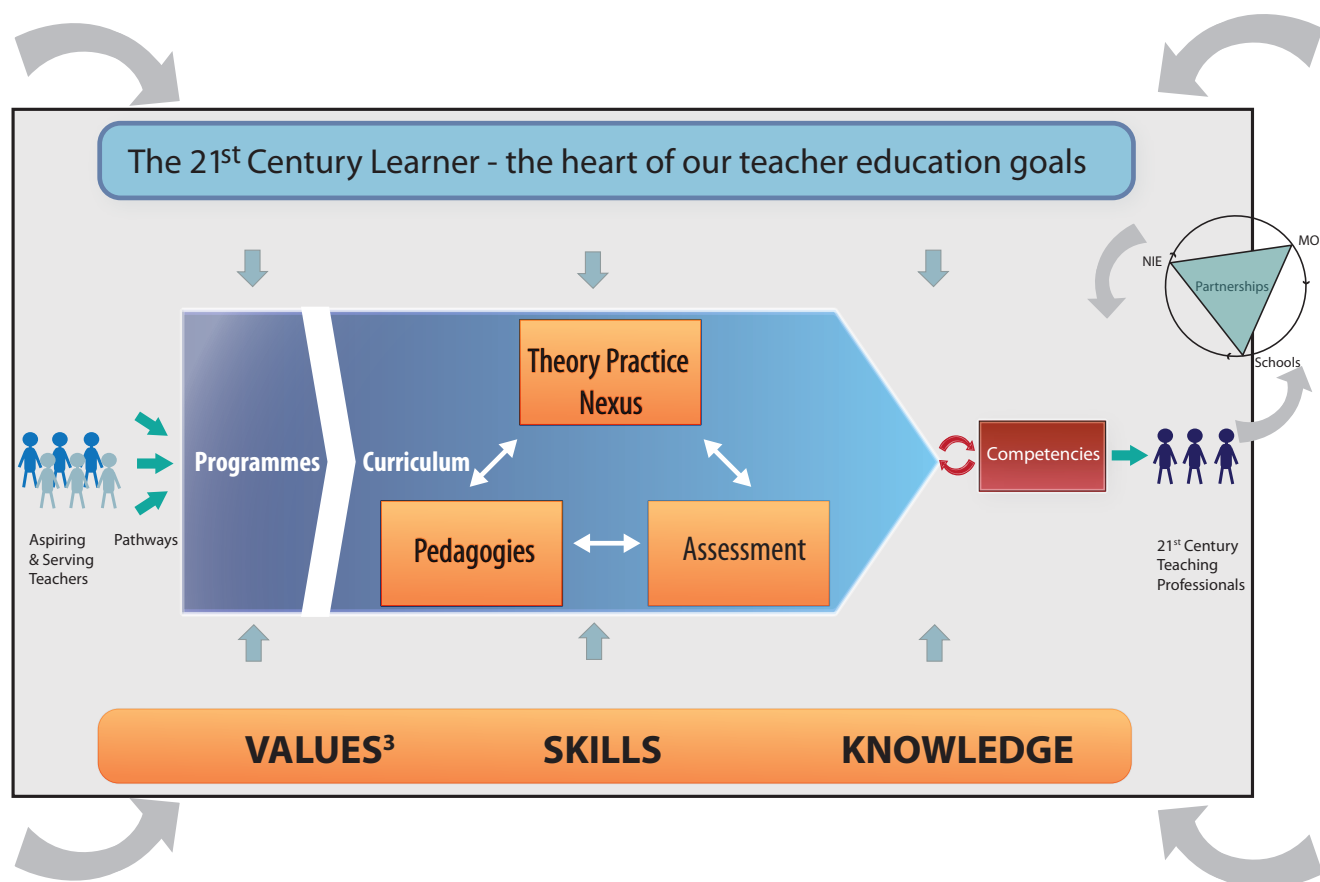
make more effective transitions to schools as well as adapt to changing school environments. Pedagogical instruction involves equipping teachers with a wide range of pedagogical skills in effective didactics, facilitation of learning, mediation of the knowledge milieu and design of learning environments. The use of appropriate evidence-based evaluations to assess learning outcomes of students is also an important instructional tool that teachers must acquire.

In the context of strengthening the Theory-Practice relationships, the success of the NIE TE21 model relies on a strong **tripartite relationship** between NIE, MOE and schools working in tandem in their specific roles to achieve the desired outcome of producing high quality teaching professionals.

While the NIE TE21 Model is based on a robust concept and strong philosophical foundations, it also has a strong adaptive feature which allows for refinement and enhancement to ensure continued relevance and long-term sustainability in a constantly evolving landscape. In the light of the new educational demands placed on our teachers, the main recommendations of the PRE initiative are intended to strengthen and enhance each critical component of the TE21 Model while building on NIE's existing strengths to ensure currency, relevance and rigour in the way that teacher education is designed and delivered at NIE. The key recommendations arising from the PRE are mapped to where the key components in the NIE TE21 Model will be strengthened and enhanced (Figure 3).

The 21st Century Learner - the heart of our teacher education goals

R6

Aspiring & Serving Teachers   Pathways

Programmes   Curriculum

R3
Theory Practice Nexus

Pedagogies   R4

Assessment   R5

Competencies   R2

21st Century Teaching Professionals

NIE   MOE
Partnerships
Schools

VALUES³   SKILLS   KNOWLEDGE   R1

Strengthening the NIE TE²¹ Model - Mapping the Recommendations

R1. New V³SK

R2. Graduand Teacher Competencies

R3. Strengthening the Theory-Practice Nexus

R4. Programme Refinements and An Extended Pedagogical Repertoire

R5. Assessment Framework for 21st Century Teaching & Learning

R6. Enhancing Pathways for Professional Development

The Enhanced Partnership Model

The Enhanced Partnership Model

The Singapore brand of education is renowned globally, with many academics, policy-makers and government leaders seeking to emulate or adapt relevant features for their own countries. The success of the Singapore school system can be attributed to three main factors: sound educational policies; the quality of teachers in schools; and the efforts undertaken at the school level to improve student learning. One of the underlying drivers of this success is the vital and robust interface between MOE, NIE and schools. Each plays a distinct yet harmonising role in achieving the desired outcomes of education.

Like many of the world's high-performing teacher education providers, NIE currently adopts a university-based teacher education model characterised by classroom-based courses and a school based-practicum. The practicum, school attachments, in-service courses as well as various forms of collaborative activities offer a glimpse of the concordant partnership that NIE shares with MOE and schools, with both stakeholders working together to help student teachers make effective transitions from campus learning to classroom teaching.

Schools also serve as fertile grounds for cultivating educational research as they are the primary locus for gathering data and assessing the robustness of NIE's latest research findings. Schools benefit from educational research through the application of research findings in the areas of curriculum design, innovative pedagogies and learning environments.

MOE's role within this education eco-system is essential, as the source of overarching policies that inform the direction of NIE's teacher education model, including the shaping of its programmes and research priorities.

Having recognised that the quality of teachers determines the quality of education, a strong strategic partnership is needed between the key stakeholders that determine the quality and excellence of teacher education - NIE, MOE and the schools. In a connected world where alliances bring to the fore combined strengths that individual players lack, it is in the collective advantage of NIE, MOE and the schools to establish a scaffold of formal or semi-formal structures to optimise long-term and sustained cooperation and collaboration.

NIE advocates an **"Enhanced Partnership Model"** (Figure 4) characterised by the tripartite relationship between NIE, MOE and schools along the whole continuum of teacher education. This model leverages on the proven strengths of NIE's university-based approach while emphasising much closer collaboration with MOE and schools than what currently exists, in order to

strengthen the theory-practice nexus. It also provides for clearly defined accountabilities for each partner, which may be more prominently weighted at different points in the teacher education continuum, starting from ITP to the early stages of a teacher's career and further in their professional development.

Figure 4 : Enhanced Partnership Model
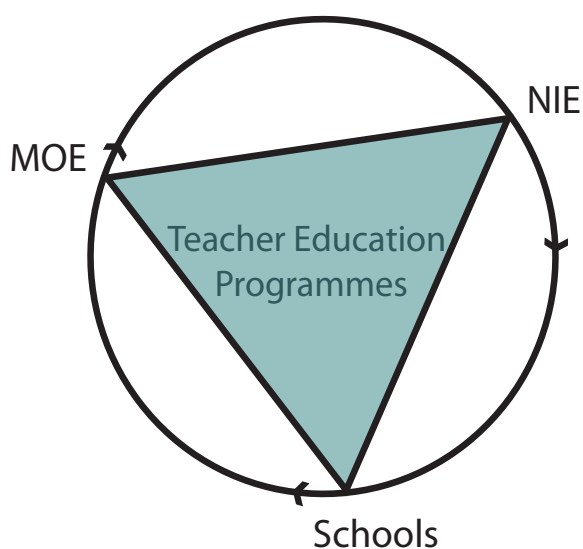
The Enhanced Partnership Model is intended to provide the necessary collaborative framework of shared values and goals which are aligned towards a unified outcome. It offers a clear articulation of defined accountabilities for each stakeholder at relevant stages in the teacher education continuum, and provides an overarching framework for closer collaboration between NIE, MOE and schools in the interest of teacher learning, as well as education research. In particular, the enhanced partnership between NIE and the schools will further help to bridge the current gaps between theory and practice, and strengthen the theory-practice relationship. A stronger tripartite partnership will support beginning teachers in making more effective transitions from the campus to schools, while enhancing the continued learning and professional development pathways available to the teaching workforce.

The NIE – Schools partnership is particularly significant in underpinning the enhancements designed to strengthen the theory-practice nexus. The **theory-practice gap** has been acknowledged as the main shortcoming of teacher education the world over, whether institutions or national agencies subscribe to the university-based or school-based models. Under the Enhanced Partnership Model,

NIE will be at the helm of formal teacher education within an academic setting, equipping and reinforcing teachers with the values, knowledge and skills that will enable them to successfully navigate the challenges of the 21st century classroom. Schools will take on a bigger, more active role in practicum, school attachments and other in-situ collaborative platforms that facilitate professional development and bridge the gap between campus-based learning and 'real classroom settings'. As NIE becomes more research-intensive, schools will also be invited to collaborate by becoming test-sites. Such a model for working relationships will in turn lead to a higher level of responsiveness by NIE to school and practitioner needs.

Transforming teacher education and bringing it to the next level is a task that NIE cannot achieve in isolation. It is an endeavour that requires a single-minded commitment from all key stakeholders – NIE, MOE, and schools, while recognising that there should be mutual respect for the differing roles, beliefs, perspectives, experiences, expertise and knowledge of each. The Enhanced Partnership Model promotes solidarity of intentions and efforts from all stakeholders working in tandem to provide teachers with the best support in equipping them for their work in 21st century classrooms.

The New V³SK Model
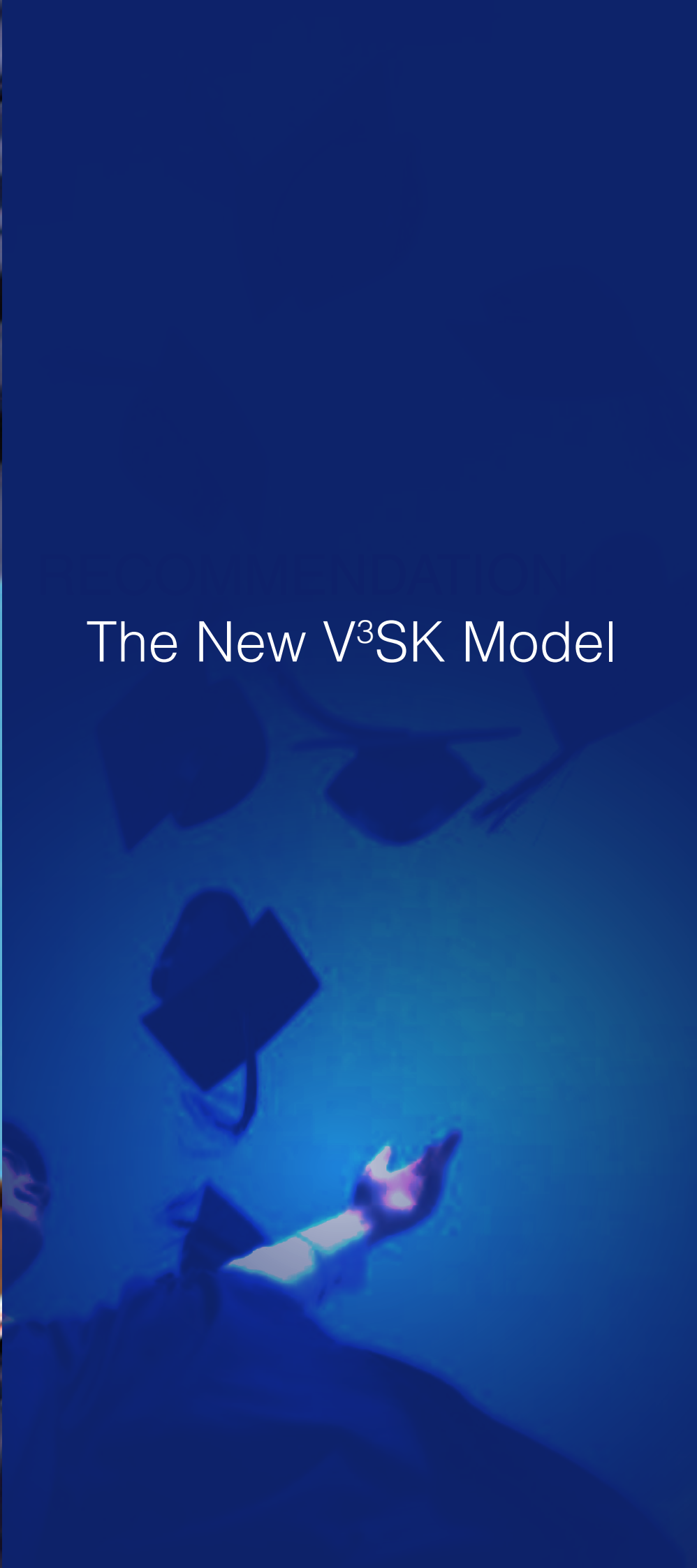
RECOMMENDATION I:
The New V³SK Model

A COMPASS FOR 21ˢᵀ CENTURY TEACHER EDUCATION

Our review takes a futuristic perspective of preparing the 21st century teacher to support the 21st century learner. A 2008 report by the International Alliance of Leading Education Institutes states that teachers are required "to engage with the moral and social purposes of schooling ... to value and sustain the intellect, to work collaboratively with other stakeholders in education, to be responsible and accountable and to be committed to lifelong learning and reflexivity"[5]

In the last decade, NIE has progressively evolved from its original ASK model (Attitudes, Skills and Knowledge) to the VSK model (Values, Skills and Knowledge). The VSK framework has guided the development, delivery and enhancement of our programmes. Its implementation represented a major shift where values are central to the calling and development of the teacher. Furthermore, the high regard for learning and mutual respect between teachers and students in the learning environment must be further rooted culturally and professionally. This can be achieved by creating a role-modelling environment which goes beyond a didactic setting and embraces the teacher as a facilitator of learning, a mediator of the knowledge milieu and a designer of learning environments.

The new enhanced version, known as the **V³SK** is first and foremost a reiteration of NIE's belief that the child is the centre of our teacher education mission. Bearing in mind the profile and the desired outcomes of the 21st century learner, it is the values, skills, and knowledge that will shape well-rounded, quality 21st century teachers who will provide our children with the best education possible to nurture their potential to become active contributors to the community. The V³SK Model illustrated in Figure 5 also takes into account the recently articulated Vision for the Teaching Service.

The desired outcome of the V³SK is therefore the child-centred teacher – one who is attuned to the needs of the child as a learner with respect to their individuality, development and diversity. In striving to develop a strong teacher identity through high standards and drive to learn, teachers will be able to improve their craft and thus create greater impact on those they teach. The value of serving the profession and the community fosters collaborative teaching and learning among peers. The advancement of the profession will positively affect the progress of teaching and learning in schools, thereby benefiting our children. Also embodied in the V³SK are the knowledge and skills that form the basis of teachers' scholarship, which in turn informs their practice of classroom teaching. These three important concepts are entwined in the V³SK to develop education professionals in the service of Singapore's children, our future.

Recommendation I is a re-conceptualisation of the VSK paradigm to further strengthen the characterisation of the 21st teacher that NIE produces. The enhanced V³SK focuses on expanding the values perspective as a three-dimensional paradigm that will permeate our programmes and curricula.

FIGURE 5: NEW VALUES, SKILLS AND KNOWLEDGE (V³SK) MODEL

Developing Education Professionals

VALUES
KNOWLEDGE
SKILLS

Attributes of the 21st Century Teaching Professional

V1 - Learner-Centered Values
- Empathy
- Belief that all children can learn
- Commitment to nurturing the potential in each child
- Valuing of diversity

V2 - Teacher Identity
- Aims for high standards
- Enquiring nature
- Quest for learning
- Strive to improve
- Passion
- Adaptive and resilient
- Ethical
- Professionalism

V3 - Service to the Profession and Community
- Collaborative learning and practice
- Building apprenticeship and mentorship
- Social responsbility and engagement
- Stewardship

SKILLS
- Reflective skills & thinking dispositions
- Pedagogical skills
- People management skills
- Self-management skills
- Administrative & managment skills
- Communication skills
- Facilitative skills
- Technological skills
- Innovation and entrepreneurship skills
- Social and emotional intelligence

KNOWLEDGE
- Self
- Pupil
- Community
- Subject content
- Pedagogy
- Educational foundation and policies
- Curriculum
- Multicultural literacy
- Global awareness
- Environment awareness

Value Paradigm 1: Learner-Centred Values

- Empathy
- Belief that all children can learn
- Commitment to nurturing the potential in each child
- Valuing of diversity

Believing that all children and youths can learn, a teacher's first and foremost characterisation as a professional is putting his/her care for the learner at the centre of all his/her work. Teacher education will emphasise awareness of the learner as an individual. This includes understanding the development, diversity and academic profiles of learners.

A central value proposition of the learner-centric approach is the need to understand the challenges that the 21st century learner is likely to face as a learner. The 21st century learner must be equipped to acquire new competencies in this age of rapid information transfer. Key traits include technological sophistication which is required to equip students to function effectively as citizens in a high-tech globalised society, as well as new competencies such as the ability to self-direct and self-monitor learning. In addition to new basic competencies, there is an increased need to emphasise higher-order thinking skills. Students have to be prepared with a different set of intelligences—which involve not only learning how to do things, but also the ability to deal with novelty as well as the capacity to adapt, select and shape their interactions with the environment—in order to function effectively in a new world in which traditional notions of transmission of knowledge, skills and attitudes are already inadequate.

In the MOE C2015 report, the competencies and mindsets required of citizens and workers of the 21st century span four domains. The first relates to the confidence of the individual and includes abilities such as being able to communicate effectively, think independently and collaborate effectively with others; the second relates to the self-directedness of learners. They question, reflect, persevere, and are able to use technology adeptly, while taking responsibility for their own learning. The third domain relates to the disposition of being a concerned citizen, one who actively participates in classroom activities, is informed about the world and local affairs, and emphasises respect for other individuals. In the last domain, individuals are adaptable, innovative and resilient;

they also exercise initiative and take risks, setting high standards for themselves.[6]

In the PERI report, MOE has also identified core knowledge and skill sets for 21st century living as key foci for primary education in the new economy. "Core knowledge skills" refers to knowledge of world issues and current affairs as well as literacy encompassing the numerical, linguistic, cultural, scientific and technological domains, while 21st century skill sets include life-long learning skills, the ability to manage ambiguity, complexity and novelty, as well as the ability to communicate new ideas.[7]

Teaching today is increasingly complex and demanding. It necessitates adaptability in existing as well as new competencies which draw on 21st century skill sets. Therefore, in order to prepare teachers of 21st century learners, there is a need to shift away from the traditional programmes which have an over-preoccupation with content towards the development of 21st century skill sets including life-long learning skills, the ability to manage ambiguity, complexity and novelty, as well as the ability to communicate new ideas. These need to be complemented by the development of pedagogical practices through which teachers can promote the development of these skill sets in their students. Teachers need to learn how to engage students in independent learning, to act as mediators of learning, to teach heuristics, to provide scaffolding and connect students to the milieu of knowledge available in texts, various other sources and the World Wide Web, and to engage in co-learning with their students.

Value Paradigm 2: Teacher Identity

- Aims for high standards

- Enquiring nature

- Quest for learning

- Strives to improve

- Passion

- Adaptive and resilient

- Ethical

- Professionalism

Teachers should be characterised by high standards and a drive to learn. The latter is particularly important when one is charged with the responsibility of educating children in an era that is characterised by rapid and continuing change.

Teachers should be imbued with a sense of "self" as a teacher. This includes pondering over what it means in terms of a professional identity. It also should be characterised by a zest for learning as well as passion for their subject discipline, always understood in relation to their role as a teacher. Hence, as education systems around the world evolve to cope with the impact of the new economy, the teaching profession must evolve in tandem. This calls for a re-conceptualisation of teacher education along with a redefined professionalism comprising the following characteristics[8]:

- the ability to use their specialised knowledge and skills appropriately in a variety of institutional contexts with diverse student demographics;

- adoption of an inquiry orientation to investigate pedagogical issues, and to be able to critically utilise evidence-based knowledge to inform professional practice;

- accepting responsibility for the academic and emotional outcomes of their students through setting realistic goals and structuring learning environments for learners; and

- engaging in continuous learning related to their own expertise and experiences so as to enhance student outcomes and strengthen professional identity.

Value Paradigm 3: Service to the Profession and Community

- Collaborative learning and practice

- Building apprenticeship and mentorship

- Social responsibility and engagement

- Stewardship

Teachers must be committed not just to the teaching profession but to the community as well. Teachers should always be looking to mentors and role models, and be prepared to mentor others at a later stage in their careers. They should also have a strong sense of responsibility to contribute to the future of the larger community - locally, nationally and internationally.

Commitment to the teaching profession requires that teachers take pride in, and take on the roles as ambassadors of their profession. In having a strong sense of belonging as a fraternity, their natural instincts should be to seek out mentors and role-models who can guide and inspire them in their apprenticeship phase. At a later stage when they have acquired sufficient maturity and experience, it will be their turn to step forward and serve as mentors to their juniors in the fraternity.

An important aspect of being part of a professional community is the ability to learn together with others in school and beyond in the more extended networks of teachers. It is also necessary for teachers to set aside sufficient time to integrate their learning from daily practice into a comprehensive change process. In this sense, schools can play a more active role by providing a supportive environment for teachers to participate in professional learning communities, as well as focused on-site professional learning opportunities.

Teachers should also have a strong sense of membership of a research-informed community of professionals, seeking common ground and collaborating with members of other professions. As such, teachers should seek to apply research findings in their quest to build their pedagogical knowledge to become better practitioners, transform classroom practices, and develop new research-based pedagogies. [9]

The Skills and Knowledge Paradigm

Skills	Knowledge
• Reflective skills and thinking dispositions *	• Self
• Pedagogical skills	• Pupil
• People management skills *	• Community *
• Self-management skills *	• Subject content
• Administrative and management skills	• Pedagogy
• Communication skills *	• Educational Foundation and Policies *
• Facilitative skills *	• Curriculum
• Technological skills *	• Multicultural literacy *
• Innovation and Entrepreneurship skills *	• Global awareness *
• Social and emotional intelligence *	• Environmental awareness *
	* new/ revamped

The skills and knowledge paradigms under the new V³SK Model are refinements of the existing model to address the requirements of 21ˢᵗ century skills. This gives NIE's TE programmes the necessary currency in the light of the new landscape which is being shaped by globalisation, changing demographics, technological advancement and education policy changes.

The Vision for the Teaching Service was launched by MOE's Director-General of Education, Ms Ho Peng, at the Teachers' Mass Lecture on 26 August 2009.[10]

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Singapore Teachers: Lead. Care. Inspire.

By word and deed, through the care we give, we touch the lives of our students. We make a difference - leading and inspiring our students to believe in themselves and to be the best they can be.

As individuals and as a community of professionals, we seek continually to deepen our expertise. Respectful of fellow educators, we collaborate to build a strong fraternity, taking pride in our work and profession.

We forge trusting partnerships with families and the community for the growth and well-being of each student.

We Lead, Care, Inspire,
For the Future of the Nation Passes through Our Hands

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RECOMMENDATION II:
Graduand Teacher Competencies

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Graduand Teacher Competencies

Recommendation II is a set of Graduand Teacher Competencies (GTCs) which provide an articulation of what NIE's ITP programmes will deliver in terms of the basic professional competence of graduates. The GTC Framework (GTCF) reflects a commitment to firstly guarantee this level of competence, and secondly to align notions of professional competence within ITP graduates, and professional competence for education officers employed by MOE.

SPECIFIED OUTCOMES OF TEACHER EDUCATION

Darling-Hammond and Baratz-Snowden (2005) acknowledge that, while "specifying what teachers need to know and be able to do is not a simple task ... [it is possible to develop a] vision of professional teaching ... [that] connects teaching with student learning and requires that teachers be able to point to evidence of that learning" [11]

The GTCF provides a holistic integration of the revised V³SK model and MOE's competencies framework of beginning teachers as expounded in the Enhanced Performance Management System (EPMS). While there is not exactly a one-to-one correspondence between any individual value, skill or type of knowledge listed in the V³SK model with any of the GTCs, there is rather, the influence of individual values, skills or types of knowledge in the definition of each of the GTCs. In the GTCF, the competencies are identified in the three performance dimensions: professional practice, leadership and management, and personal effectiveness, which are found in MOE's EPMS.

The titles and organisation of GTCs in terms of these three performance dimensions and core competencies are summarised below in Table 3.

TABLE 3: ORGANISATION OF THE GRADUAND TEACHER COMPETENCIES

Performance Dimensions	**Core Competencies**

Professional Practice	1. Nurturing the whole child
	2. Providing quality learning of child
	3. Providing quality learning of child in CCA
	4. Cultivating Knowledge:
	   i. with subject mastery
	   ii. with reflective thinking
	   iii. with analytic thinking
	   iv. with initiative
	   v. with creative teaching
	   vi. with a future focus

Leadership & Management	5. Winning Hearts and Minds
	   i. Understanding the Environment
	   ii. Developing Others
	
	6. Working with Others
	   i. Partnering Parents
	   ii. Working in Teams

Personal Effectiveness	7. Knowing Self and Others
	
	   i. Tuning into self
	   ii. Exercising personal Integrity and legal responsibilities
	   iii. Understanding and respecting others
	   iv. Resilience and adaptability

It must be stressed that the GTCs address the competencies of a **graduating teacher from ITP programmes** as distinct from a beginning teacher defined by MOE as someone who has been in the teaching service for between 1 to 3 years. They specify the basic achievements that students should have demonstrated at the point of graduation from NIE's ITP programmes. Competencies which are outside this framework will need to be addressed under MOE's Learning Framework for Teachers.

The competence expected of graduating teachers in relation to each GTC has been specified in terms of two focus levels – Capacity Building (CB) and Awareness (A).

i.   **'Capacity Building'** - where each graduating teacher should be able to demonstrate the achievement of the defined competency;

ii. **'Awareness'** - where graduating teachers are aware of what these competencies mean, but are not yet able to demonstrate their achievement as professional capacities. Obviously, these would be areas that graduands would need to develop further through induction, mentoring and professional development if they were to bring these from 'awareness' to 'capacity building' level.

Table 4 at the end of this chapter shows the specified outcomes of each of the GTCs in terms of Capacity Building (CB) or Awareness (A) levels.

In any teacher education programme, it is not sensible to expect that graduating teachers will achieve an equivalent level of competence across all competencies. To promise these competencies in a fresh graduate would not be realistic. Thus, what is proposed here is that basic 'Capacity Building' competencies will define the graduating teacher, and that it is incumbent upon NIE to deliver this expectation to stakeholders. As for competencies categorised as 'Awareness', these will have to developed further through ongoing professional development, especially during the BT phase of each teacher's career.

The GTCF indicates that, at the end of their ITP programme, graduating students will have been adequately prepared to deal with the core roles of **nurturing the child and quality of learning of the child**; **strong subject mastery and competencies related to the teaching and learning of the subject**, **working with and respecting others**; and **values pertaining to self.** These are the deliverables and outcomes that should be evident in the professional work of all graduating teachers that are sent to the schools.

Impact on programmes

Since this new GTCF incorporates the attributes in the V³SK Model, there will be a need to re-examine programmes in terms of structure, delivery and assessment so that those competencies termed as 'capacity building' are the 'guaranteed' outcomes. Specifically, assessment tasks will need to be aligned with these competencies, and to explore how this "guarantee" can become evidence-based.

As the GTCF proposed has been developed primarily with the PGDE in mind, there is a need for further adaption for ITP programmes with longer durations, namely the Diploma of Education and Bachelor of Education. The focus will be on extending either the range or definition of competencies, as well as the designations of levels of competence expected.

The next important step is to map out where the competencies are addressed in the courses and how these competencies, especially at the 'CB' level are developed and assessed. The quality of instruction and learning opportunities to cultivate the 'CB' competencies must be clearly articulated. For this to be accurately monitored, all course outlines must indicate which competencies, and at what level (CB or A), each course addresses.

Student Teachers Mapping Their Learning Journeys

Student teachers, by referring to the GTC Framework, will be able to map out their learning journeys, identifying where they perceive to have been well prepared (CB), and sufficiently exposed to elements that they needed to be aware of and which they would need to strengthen further in the 'beginning' phase of their professional career (A).

ITP programmes mark the formal commencement of the continual process of teacher learning. A beginning teacher's expertise in handling routine teaching and other domain-specific professional matters develops over the

initial years of induction and professional development, as they move towards the development of adaptive expertise[12]. The specification of competencies through the GTCs will assist schools and MOE to focus support during the BT phase on both the extension of the capacity built during ITP in areas such as management of learners and learning, and monitoring and assessing learning, as well as the conversion of 'awareness' into 'capacity' in areas such as teaching creatively and partnering parents.

In any robust system, there is a need to evaluate the quality of graduates in terms of these core competencies. Examples of measures that could be adopted include:

- Self-reporting by individual student teachers based on the GTCF where they will indicate where they were relative to the CB/A competencies at entry into the programme and where they are at the exit point and what do they hope to focus and develop in the next couple of years into teaching.

- Using portfolio assessment at the end of their programmes. This portfolio could include different kinds of papers, projects and other forms of learning and assessments that students themselves will choose to reflect the range and depth of core competencies they have developed during preparation. These will have to be evaluated by internal as well as external evaluators. (*The portfolio approach will be further elaborated on in the chapter for Recommendation V : Assessment*)

TABLE 4 : GRADUAND TEACHER COMPETENCIES FRAMEWORK

PROFESSIONAL PRACTICE

Core Competencies	Definitions	Focus level of ITP Learning
1. Nurturing the Whole Child	The teacher believes that all pupils can learn. The teacher shows care and concern for all pupils. The teacher: – develops a culture of care, trust and friendliness that enhances the well being and character development of pupils; – uses a variety of methods to determine current and future pupil needs and expectations, and provides necessary guidance and support; – encourages practices that support the physical, emotional and social well-being of pupils; – has high expectations of all pupils, respects their varied backgrounds, and is committed to their development as learners; – uses communication skills, listening and attending skills in his/her interactions with pupils; and, has skills in identifying and assisting pupils with basic learning problems.	*Capacity Building*
2. Providing Quality Learning of Child	Teaching for Learning – the teacher: – has a well integrated understanding of how pupils learn and develop and provides learning opportunities that support their development; – is organised and self-managing in relation to time, planning, resources, attention and relationships; – creates instructional opportunities adapted to diverse learners; – uses a variety of instructional strategies to teach concepts in ways that encourage pupils to see learning as meaningful; – has a repertoire of approaches that engage pupils in problem-solving, and critical and creative thinking; and, – plans, develops and delivers IT-integrated and multi-media supported learning experiences to engage pupils and to help them understand issues pertaining to cyber wellness. Management of Learners and Learning – the teacher: – creates and maintains an effective classroom environment that encourages positive social interaction, self-motivation and active engagement in purposeful learning; – manages the resources of time, space; activities, and attention to engage pupils individually and in groups in productive tasks; – proactively plans to maintain discipline and order in class; – facilitates pupils' acquisition of self and relationship management skills; and, – uses basic helping skills to assist pupils in coping with learning.	*Capacity Building*

Core Competencies	Definitions	Focus level of ITP Learning
	Monitoring and Assessing Learning – the teacher: – understands the link between the purpose of assessment and the intended learning outcomes; – comprehends that assessment is closely tied to the teaching learning activities; – comprehend that assessment is closely tied to pupil motivation and their academic performance; – understand the interdependence of 'assessment of learning' on 'assessment for learning'; – can use a range of appropriate monitoring and assessment strategies and instruments to identify learning needs, to evaluate progress, to provide evaluative feedback to help pupils in their progress, and to take follow-up action – understands statistical concepts in representing pupils' patterns of responses to assessment tasks; and, – recognises objective and ethical assessment procedures.	*Capacity Building*
3. Providing quality of learning of child in Co-Curricular Activities	The teacher is aware of the opportunity to use CCA to inculcate desirable values and attitudes, and to support the holistic development of pupils. The teacher is aware of: – the use of CCA to provide opportunities for pupils to maximise their potential and is committed to supporting CCA activities; – the need to manage pupil behaviour in CCA activities; and, – basic safety procedures / considerations during activities, including basic first aid.	*Awareness*
4. Cultivating Knowledge with : i. Subject Mastery	The teacher shows strong working knowledge of subject matter and related educational issues, and seeks to deepen his/her understanding of the subject area and teaching practices. The teacher: – draws on deep and well integrated disciplinary knowledge; – draws on well developed Pedagogical Content Knowledge; – has knowledge of recent developments in the field; – helps pupils associate concepts and principles to their everyday experiences; and, – is able to apply his/her subject knowledge to help learners of different levels understand core concepts and their applications.	*Capacity Building*
ii. Reflective Thinking	The teacher adopts a critically reflective stance towards his/her own professional practice as a basis for ongoing monitoring and refinement of those practices, including the identification of strengths and areas for improvement. The teacher: – seeks opportunities to grow professionally; and, – is aware of major areas of research on teaching and of resources for professional learning.	*Capacity Building*

Core Competencies	Definitions	Focus level of ITP Learning
iii. Analytic Thinking	The teacher demonstrates a capacity to engage with problems. The teacher: – identifies possible cause-and-effect relationships, develops plans to respond, prioritises tasks in order of importance, and carefully monitors responses; – makes and defends complex choices and decisions; and, – frames, analyses and synthesises information in order to solve problems and provide solutions.	*Capacity Building*
iv. Initiative	The teacher seeks opportunities to take initiative to improve his/her professional practices. The teacher is aware of the value of, and need for skills in innovation and entrepreneurship.	*Awareness*
v. Creative Teaching	The teacher explores the use of creative teaching techniques / strategies to cater for pupils with different abilities.	*Awareness*
vi. with a Future Focus	The teacher is committed to environmental sustainability, social justice and equity. The teacher is aware of the need to develop 21st century skills and values in his/her pupils. The teacher recognises that, in a rapidly changing world, the ability to experiment with and advocate for new practices will be a core professional capacity.	*Awareness*

LEADERSHIP & MANAGEMENT

Core Competencies	Definitions	Focus level of ITP Learning
5. Winning hearts and minds: i. Understanding the Environment	The teacher is aware of the rationale for national education policies and practices and their infusion. The teacher: – has critical awareness of the norms and values inherent in the Singapore system of education; – understands the Desired Outcomes of Education; and, – is aware of the role of school rules, and is committed to understanding and abiding by the operating procedures and organisation structure of the school to which he/she is appointed.	*Awareness*
ii. Developing Others	The teacher takes initiative to support peers and colleagues.	*Awareness*

Core Competencies	Definitions	Focus level of ITP Learning
6. Working with Others: i. Partnering Parents	The teacher: – is aware of the need to build collaboration and partnership with parents to maximise the learning of pupils; – uses strategies to keep parents informed on the progress of pupils and school activities; and, – values perspectives of parents.	*Awareness*
ii.Working in Teams	The teacher actively seeks out opportunities for professional collaboration within and beyond the school. The teacher: – cooperates with and supports colleagues; – shares information and good ideas; – expresses positive expectations of others; and, – speaks positively of team members.	*Capacity Building*

PERSONAL EFFECTIVENESS

Competencies		Definitions	Focus level of ITP Learning
7. Knowing Self and Others i.	Tuning into Self	The teacher takes care to: – monitor his/her emotional and professional self in order to identify immediate support and/or developmental needs; and, – to achieve work-life balance, and seeks guidance where necessary.	*Capacity Building*
ii.	Exercising Personal Integrity and Legal responsibilities	The teacher is aware of the need for professionalism in all aspects of his/her demeanour. The teacher is aware of his/her legal responsibilities and the need to maintain high standards of professional integrity when discharging his/her duties and responsibilities.	*Awareness*
iii.	Understanding and Respecting Others	The teacher is committed to National Education, and to valuing diversity in all its forms. The teacher demonstrates sensitivity to cultural and religious differences.	*Capacity Building*
iv.	Resilience and Adaptability	The teacher: – is tough in spirit, able to persevere in times of challenge, keeping a positive disposition; – stays the course though there may be obstacles to surmount (he/she is optimistic); – is able to think on his/her feet and make decisions appropriate to the situation at hand; and, – encourages and teaches her/his pupils to be resilient and adaptable.	*Capacity Building*

RECOMMENDATION III:
Strengthening the
Theory-Practice Nexus

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Strengthening the Theory-Practice Nexus

Recommendation III involves strengthening current approaches which have proven to be effective, while reinforcing the Theory-Practice linkages with additional measures.

PUSHING TOWARDS PRACTICE: MOVING FROM KNOWING TO DOING

The theory-practice gap has been acknowledged as an almost universal phenomenon not just in education, but in almost all the professions. In teacher education, four oft-cited approaches used by NIE in bridging the theory-practice link are reflection, school-based inquiry or research, pedagogical tools that bring the school classroom into the university tutorial and experiential learning (refer to Figure 6).
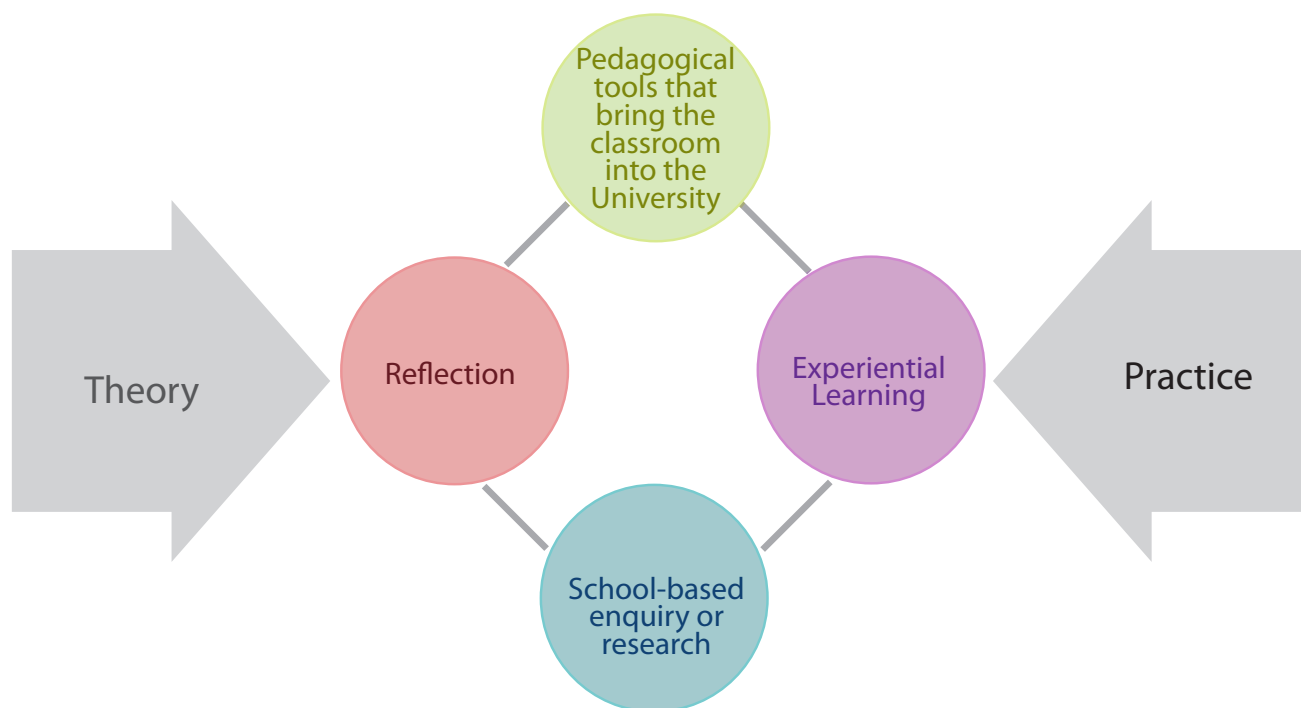
Reflection

The focus here is reflection that is planned and structured (as opposed to ad-hoc and informal) as a part of teacher inquiry, collaborative learning and purposeful educative conversation. Reflection may take place through journals, video analyses of lessons, or discussions with mentors or university professors. Whichever means are applied,

research shows that learning does not come so much from experience as from reflection on experience and interaction with others.[13] Hence, one of the most critical ways in which reflection links theory and practice is the establishment of a learning community that closely involves all participants in a shared understanding and commitment to bridging theory, pedagogy and practice. Classrooms become sites of inquiry, reflection, and collaboration instead of places where the individual teacher is isolated, traditional practice is reinforced and where teachers are expected to be clones of the mentor teacher.[14]

School-based Inquiry or Research Projects

Essentially this refers to research conducted by teachers on an aspect of their practice or a specific concern or issue encountered in the classroom. School-based inquiry is also synonymous with action research, teacher-research, classroom research, practitioner inquiry or teacher inquiry.

The origins of this form of teacher inquiry stem from Dewey's notion of 'reflective action' as well as Schon's depiction of the teacher's professional practice as a cognitive process of posing and exploring problems or dilemmas identified in the course of their practice. In so

doing, they raise questions that other researchers may not perceive or deem relevant.[15]

The primary aim of such research is the improvement of practice and to bring the two realms of knowledge and experience together – building personal-professional knowledge. Action research steers teachers toward a continued interest in serving their students better and providing increased accountability for their own teaching.[16] Elden and Chisholm characterized the process as a 'cyclical inquiry' process that involves identifying and defining a problem, developing action steps as a way of resolving the problem or improving the situation, implementing those action steps, and then evaluating the outcomes.[17]

Action research … is about teacher-practitioners studying real classroom or school situations and fostering a reflective and inquiring education community committed to formulating actions that work. Action research helps teachers to first reflect on their teaching practice and then systematically collect and analyse classroom evidence in order to better understand their own practice. Teachers in action research are focused on their students' learning and well-being and improving the quality of their practice.[18]

- Ms Ho Peng, Director-General of Education, MOE

Exemplar 2: School-based Projects

In the Advanced Diploma courses known as 'thematic primary science inquiry approach series', there is the application of both the principles of science and the theory of the inquiry approach to the design and oral presentation of an actual school-based inquiry-based lesson.

In the school-based project offered as part of the Management and Leadership in Schools (MLS) for Heads of Departments in schools, there is a curriculum design project. Participants undertake the project with a host school. They are required to identify the context, and the needs and problems of the host school so as to develop a curriculum unit that shows an understanding of the curriculum development process, rationale for the use, etc. This provides a platform for learning that integrates theory, practice and the real curriculum needs of the school.

Pedagogical tools that bring the school classroom into the university

One common view of learning to teach is that the university-based components of teacher preparation offer the theoretical underpinnings while school teaching experience offers practical expertise. This view assumes that the expertise of teaching resides in schools.[19] However, university teacher preparation that aims to bridge theory and practice inducts student teachers with classroom expertise by constructing appropriate ways for them to experience various aspects of teaching in a 'simulated' environment, be it through problem-based learning, case studies or study of authentic lesson scripts.

Research shows the importance of students having to develop essential teaching skills (listening, structuring content, timing) before they can respond effectively to "learning–by–teaching".[20] Hence, the use of pedagogical tools such as analysis of lesson scripts and videos of classroom lessons in university-based seminars provide an important induction into the world of teaching. By analysing and critically reflecting on authentic lesson scripts or case studies, student teachers are provided the opportunity to reflect on learning points identified in the scripts, as well as critique their effectiveness during observation of video footages of the lesson in question. The subsequent discussion and critique gives students the chance to link theory back to practice by highlighting positive teaching practices (what worked) and identifying specific areas for improvement. Such tools give student teachers a glimpse of how idealised methodology gets translated into practice in the school setting.[21]

Exemplar 3: Pedagogical tools that bring the school classroom into the University

In a PGDE ITP course known as Language Teaching Experience, student teachers use authentic teaching resources, such as school textbooks, assessment papers, and students' essays to critique and develop their own lessons.

In a Masters' level course Developing Competence in Writing and Grammar, students are given authentic transcripts of writing lessons to see how teachers in Singapore teach different genres of writing. They reflect on their own teaching practices and critique the lesson through the lens of theories of writing pedagogy.

Experiential Learning

Cantor defines experiential education as "learning activities that engage the learner directly in the phenomena being studied". In addition to practicum, other examples of experiential learning include fieldwork, microteaching, teaching activities in schools, service learning and field trips. These activities facilitate the comprehension of abstract concepts and theories, and build transitional links between the university and the classroom experience.[22]

Exemplar 4: Experiential Learning

In a mandatory service-learning project for all ITP student teachers known as 'Group Endeavours in Service Learning' (GESL), student teachers embark on 20 hours of engagement with a community of their choice. There are two deliverables: to complete an end-of-project reflection; and, to showcase their projects during designated 'Service Learning Days'. GESL provides student teachers the background knowledge and skills in service learning, community involvement projects (CIP) and project work (PW) thus broadening their overall teacher preparation educational experience.

While these are good exemplars of effective theory-practice approaches, there are several ways by which the theory-practice nexus can be further strengthened. The next part of this chapter focuses on six additional approaches which can be adopted.

Approach 1 : Structured Mentorship Preparation Programme

It is envisioned that School Coordinating Mentors (SCMs) will have expanded roles in the practicum and later, in the beginning teacher induction period. To equip SCMs and prepare them for their enhanced roles and responsibilities, a customised mentor training programme by NIE is proposed. The training will be a staged developmental programme aimed at building the competencies of the SCMs to match the needs of student teachers. It is proposed that the mentor training programme include the following:

- Familiarisation with NIE programmes, including terminology and concepts derived from educational research

- Helping SCMs make explicit their implicit understanding of their own practice, and reflecting on the adequacy of those understandings

- Mentoring skills

- Organising and facilitating learning community discussions, e.g. Professional Learning Inquiry Sessions (PLIS) and Professional Learning Communities (PLC)

- Scaffolding of classroom observation and feedback techniques

Stage	Proposed Topics
Basic/ Foundation	a. Role of the new teacher mentor b. Developing an effective mentoring relationship c. Identifying student teacher/beginning teacher needs d. Understanding phases of teacher development from student teacher to beginning teacher and beyond e. Professional oral literacy f. Formative assessment of student teachers g. Familiarisation with NIE programmes
Intermediate	a. Coaching and observation b. Cognitive coaching c. Reflective practice d. Evidence-based revision of practice SCMs will also be equipped with the knowledge of organising PLCs or PLIS. In addition, weekly forums (cluster/ zone based) will be conducted to give them opportunities to refine their mentoring skills, work collaboratively and share insights, challenges and successes. Platforms for sharing could also be provided by TDD/ TDC. SCMs should also be ready to train their school's Cooperating Teachers (CTs).
Advanced	At this stage, SCMs should be ready to expand their roles. This will include coaching potential SCMs. In weekly forums, the following issues could be discussed: a. Mentor professional growth b. Advanced mentoring skills c. Becoming a mentor trainer d. Evaluation of school mentor programme e. Sharing of good practices

In order for SCMs to take on the enhanced roles, they will need to complete at least the intermediate stage of the mentor preparation programme. Apart from the specified training areas to be covered under the programme, a Mentoring website with content such as basic guidelines on key responsibilities and best practices can be created by MOE to provide learning and networking platforms for SCMs.

Approach 2 : Strengthening Mentorship before, during and after practicum

Currently, as much as 40% (or 1 Semester) of our PGDE programmes is devoted to the practicum. While this percentage of field exposure is highly commendable, the outcomes can be further enhanced by strengthening the mentorship provided before, during and after the practicum. The current role of the School Coordinating Mentors should be enhanced in order to ensure a continuum of mentorship from before practicum to during practicum, all the way to the beginning teacher induction period. A key role of the SCM will be to hold the PLIS, which are meant to initiate student teachers to the idea of PLCs. Specifically, the PLIS aims to create a supportive learning community for student teachers, helping them to reflect on and explore their practicum expectations and experiences before, during and after the practicum, and to develop a shared professional language amongst the student teachers, schools and MOE. (Refer to Table 6 detailing the additional roles recommended for the SCM.

TABLE 6: ENHANCED ROLE OF SCHOOL COORDINATING MENTOR

Programme	Additional Roles of School Coordinating Mentor
Before Practicum	- Lead pre-practicum PLIS in collaboration with student teachers, CTs, NIE Supervision Coordinators (NSCs) to explore and discuss expectations and preparation for practicum - SCMs induct student teachers into the school system and arrange meetings with their CTs and draw up their time tables

During Practicum	- On top of their coordinating role within practicum, SCMs will also act as group mentors and group coaches
	
	- SCMs will be equipped with expertise and given adequate time to perform the following roles effectively:
	  • observing lessons
	  • providing non-judgmental feedback
	  • providing inputs to the CTs and NSCs for the assessment
	  • conducting PLIS to reflect on ongoing practicum experiences

After Practicum	- Lead post-practicum PLIS in collaboration with student teachers, CTs, NSCs to reflect on Practicum experiences - SCM and student teachers meet for closure on practicum

Approach 3 : Greater infusion of NIE-School Interactions

Besides the practicum, there currently exists a range of NIE-school interaction opportunities for student teachers as highlighted by the four approaches discussed earlier, i.e., reflection, school-based inquiry or research, pedagogical tools that bring the classroom into the university tutorial, and experiential learning (Table 7). The challenge is to expand the opportunities for our teachers in a more systematic and meaningful manner at both the course and programme levels. Such interactions can also include interweaving short stints (e.g. 1 day in a week) of school-based practice for on-campus courses.

S/N	Interactions & Details	Examples
1	**Reflection** Planned and structured reflection on school experience at the personal and collaborative level	Incorporating post-practicum reflection and critical evaluation of lessons taught during practicum as components of a course
2	**School-based inquiry or research** Inquiry or research conducted on school/ classroom issues, or aspects/ concerns underlying one's practice in the classroom. It may involve identifying and defining a problem, developing action steps, implementing those steps and evaluating the outcomes.	Inquiries into how schools use C2015, TLLM, PERI, mp3 initiatives to serve as exemplars of how to translate latest educational initiatives into either curriculum design or pedagogical practice Applying the principles and theory of the inquiry approach to design a presentation of an actual school-based lesson Conducting a school-based research project that looks into aspects of classroom practice and /or student learning, e.g. group work, strategies for differentiated instruction
3	**Pedagogical tools that bring the classroom into the university** Problem-based learning, case studies, analysis and critical examination of authentic lesson scripts, assessment texts, examination questions	Working with schools to create problem-based scenarios based on real-life challenges for use in courses
4	**Experiential learning** Learning activities that are conducted *in-situ*; include microteaching, teaching activities in schools, fieldwork, and service learning	Theories of teaching the discipline are introduced and demonstrated through micro-teaching in schools.

Approach 4 : Secondment of practitioners from schools to NIE

Currently, about 11% of academic staff at NIE are seconded Education Officers from MOE. More practitioners should be identified for secondment to NIE on 2-year contracts or for short-term (three months) attachments as part of their planned career and professional development. The secondment of these practitioners to NIE will facilitate the development of a shared professional language with academics. This will ultimately benefit all teachers as it will facilitate interaction at a deeper level between student teachers and practitioners with years of experience.

Approach 5 : Structuring the Enhanced School Experience (ESE)

Currently, student teachers enrolled in the PGDE (July intake) programmes undergo a four-week stint in schools known as the Enhanced School Experience (ESE), organised by MOE. The goal of the ESE is to allow student teachers early exposure to the school environment so that they will be inducted into classroom teaching and be able to understand the multi-faceted roles of the teacher. Unsuitable candidates can also be identified at this very early stage. Though the goals of the ESE are sound, the experience can be further enhanced by structuring it to enable student teachers to fully benefit from it. Their induction to the school culture and environment should involve opportunities to observe experienced teachers and to co-teach with them. In addition, there should also be a structure for observing and reflecting on these experiences. The proposed structure of the four-week ESE is as shown in Table 8.

TABLE 8: SCHEDULE OF A TYPICAL ENHANCED SCHOOL EXPERIENCE

| Week	Objectives	Possible Activities	Deliverables
1	• To introduce the Model of Reflective Teaching to candidates • To induct candidates to school culture • To expose candidates to an array of pedagogical approaches to teaching • To introduce candidates to the various administrative duties performed by teachers	• Candidates will undergo induction and a series of lesson observations comprising a selected group of experienced teachers.	
2	• To help candidates understand the demands of preparing and conducting lessons • To prepare candidates for co-teaching • To include candidates as part of the learning community of teachers who share their practices with one another	• An experienced teacher will be assigned as buddy to each candidate • Candidates will observe structured lessons of their buddy teachers and learn how to plan a lesson • Candidates to be assigned to a Learning Team in the school	• Candidates to come up with a lesson plan that they will use to teach in the following week • Candidates will keep a journal of learning points and reflections from lesson observations and discussion in the Learning Team
3 & 4	• To allow candidates to have first-hand experience in teaching • To expose candidates to other forms of developing students through CCA • To encourage candidates to take ownership of their learning through self evaluating and planning their learning agenda	• Candidates will co-teach with their buddy teachers. • Debrief sessions will be conducted after these lessons. • Candidates to be assigned to co-lead a CCA.	• Candidates will self-rate themselves against Graduand Teacher Competencies • Candidates will develop their "Personal Learning Agenda" for their time in NIE • Candidates will keep a journal of learning points and reflections from co-leading a CCA

While NIE is not directly involved with the implementation of the ESE, our role is to brief the student teachers on the structure and expectations of the programme, as well as to prepare the mentors (through the Mentor Preparation Programme) in their roles and responsibilities as buddy teachers.

Approach 6 : Reflective Teaching Model

While the importance of reflection is not new to education, the techniques of reflective practice are relatively recent. To help teachers improve their teaching craft and strengthen the theory-practice nexus, a comprehensive model for reflective teaching which may be useful for teachers is illustrated in Figure 7. The model illustrates the interaction between the teacher's dispositions (being), practice (doing), and professional knowledge (knowing). As such it indicates how personal-professional knowledge is built. At the heart of the model is a 4-stage cyclical process which facilitates reflection in action and on action. These four stages are:

- **Observing** (What happened?): e.g. What did I do/ say? What did others do/ say?

- **Reflecting** (Why?): e.g. Why did I think things happened this way? Why did I choose to act the way I did? Why did I choose to adopt this mode of instruction?

- **Planning** (So what?): e.g. How might this change my thinking behaviour or interactions with others? What might I do differently?

- **Acting** (Now what?): e.g. What do I want to remember to think about in a similar situation? How do I want to act?

FIGURE 7: REFLECTIVE TEACHING MODEL
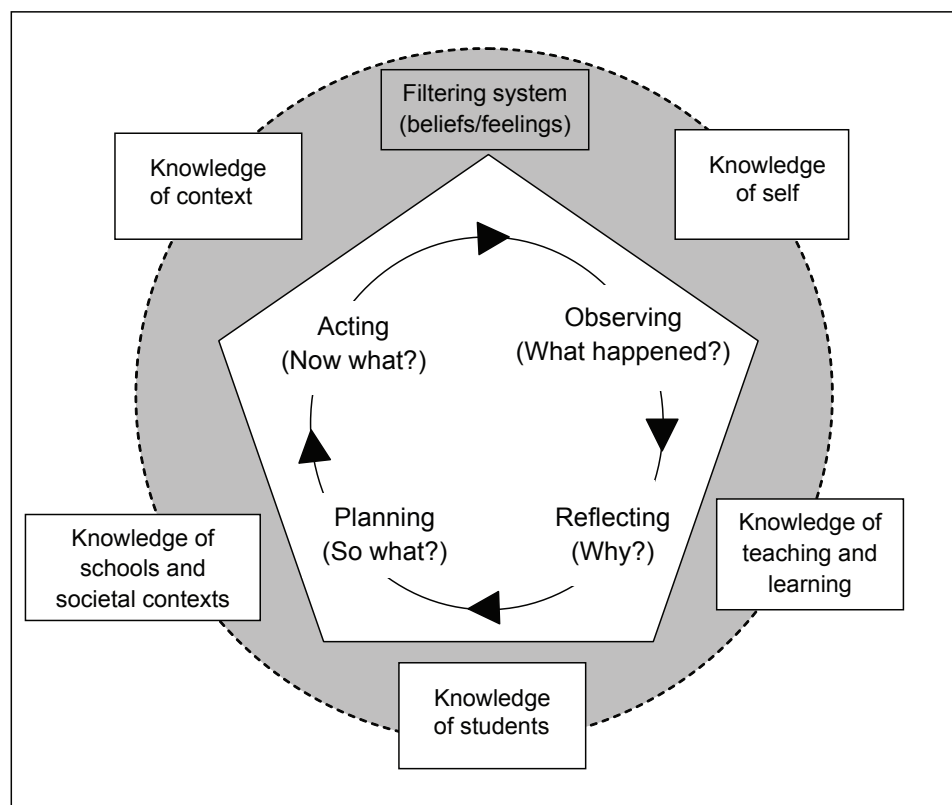
(Adapted from Langer, Colton, & Goff, 2003,[23] and York-Barr, Sommers, Ghere & Monti, 2001[24])

The shared area (*filtering system*) between the reflective cycle and the professional knowledge base illustrates the prior beliefs, attitudes, values and assumptions that student teachers have, that "filter" or impact on their teaching experiences and knowledge-bases. This cycle is developmental and continuous, with no beginning or end, as each stage is based on the previous one and serves as the impetus for the next. It can occur at different levels of sophistication. Van Manen, proposes three major hierarchical levels at which reflection may take place[25]:

- *Technical Reflection* is the most basic level of reflection. It focuses on what works in the classroom. At this level, teachers are concerned with applying knowledge to achieve instrumental outcomes, and actions taken are evaluated on the basis of their success or failure in the classroom.

- *Practical Reflection* is the next level of reflection. It focuses on the learning experience of the student. It goes beyond technical-rationality into investigating, questioning and clarifying the end objectives and the assumptions behind teaching activities designed to achieve those objectives.

- *Critical Reflection* is the highest level of reflection. It focuses on what knowledge is of value and to whom. At this level, teachers are not simply concerned about the goals, the activities and the assumptions behind them but they reflect upon the larger context of education and question their practices critically, particularly in connection with ethical and moral issues.

It is expected that our teachers will exhibit technical rather than critical reflective skills in the beginning, but the usefulness of this model is that it offers scaffolding techniques that supervising or co-operating teachers would find useful in guiding the reflection of ITP students or beginning teachers. As teachers become more confident, they can use this model on their own. While the Reflective Teaching Model should not be seen as prescriptive, it will nonetheless provide a common framework to help teachers consolidate their experiences and guide them in systematically reflecting on their practices. SCMs will be exposed to the model which can be used during PLIS. The model will also be incorporated into the new portfolio assessment approach for NIE's TE programmes.

RECOMMENDATION IV:
Programme Refinement and An Extended Pedagogical Repertoire

RECOMMENDATION IV:
Programme Refinement and An Extended Pedagogical Repertoire

DEPTH AND ENGAGEMENT

The exponential growth of knowledge and the advancement of technology have changed the educational needs of students in the 21st century. Learning has to go beyond memorising facts for regurgitation. In this era, teachers are no longer mere providers of information but facilitators who enable students to understand their own learning, which allows them to make use of information towards higher order thinking.

Teachers need to develop students to be knowledge-driven, self-directed, collaborative and technologically savvy learners. Effective teachers have to be facilitators of learning, mediators of the knowledge environment and designers of the learning environment. They need to conceptualise the engagement of students in terms of deeper understanding and active learning within and outside the classroom. School systems today have to be geared to equip children with the necessary life-skills to develop into confident individuals and concerned citizens.

Learning outcomes must be measured beyond grades. Students should have intelligences that are related to the reality of the environment to enable them to solve problems that are meaningful, relevant and contextualised. Therefore learning must have a strong infusion of reality and context. In order to accomplish this, teaching approaches should lead to best practices that NIE must model to its teachers, and multi-designed learning must be sufficiently deep to impact thinking and learning. To this end a bold vision of pedagogies is needed.

Recommendation IV involves establishing a Pedagogies strategy and framework for 21st century teaching and learning, to ensure that appropriate and effective pedagogies are used in the NIE curriculum, with the objective of equipping teachers with the instructional strategies needed for classroom learning.

Two key principles uphold this framework: that pedagogies should be discipline-appropriate, which is the basis of multi-disciplinary learning, and that they must be learner-centred.

In order to ensure that pedagogical knowledge and skills are transferred to teachers for translation into classroom practice, NIE educators must model and engage their

students beyond the traditional modes of instruction such as lecture-and-tutorial, role modelling, and micro-teaching. There must be a conscious effort to highlight best pedagogical practices to the teachers undergoing our programmes. The most important ingredient in 21st century learning skills development is the concept of the teacher as a 'lead learner', embodying the principle that the best teachers are also learners who lead through practice. NIE educators' role is two-fold: to develop the capacities of 'lead learners', and modelling those capacities in teacher education.[26]

The key outcome of the Pedagogies strategy is that there will be both breadth and depth of pedagogical practices, as well as a robust mechanism to ensure that the most appropriate pedagogies are applied to suit various instructional needs. The strategy which has to be driven by programme development and innovation will also provide a framework for organising the following key processes:

- Mapping of existing pedagogies against the various courses offered in NIE
- Assessing and validating their effectiveness and the corresponding research disciplines and learning situations where they were used
- Providing learning and sharing platforms to facilitate

dissemination of good practices and validating the effectiveness of new pedagogies that expand the range of practices that teachers experience in NIE programmes
- Systematic scaling up of effective practices institute-wide and development of new practices

In validating the effectiveness of pedagogies that are adopted, it is necessary to consider whether these instructional strategies fit into the pedagogical approaches used in teacher education and that which teachers can translate in the school setting. A Pedagogical Map (Figure 8) provides a basic framework and context of pedagogical practices which are matched with existing approaches. The V³SK underpins the framework, in that the practices are anchored on values, reflect deep knowledge of content and are rich in pedagogical skills. These practices will be one of the competencies that we will develop in our teachers and will be evaluated against the GTCs. To ensure that a range of effective and innovative pedagogies are covered across the curriculum, this framework will be further developed and will be used to map against NIE's courses.

Figure 8: MAP OF PEDAGOGICAL APPROACHES AND PRACTICES IN TEACHER EDUCATION PROGRAMMES

Values³   Skills   Knowledge   (V³SK)

Values -anchored, Deep Knowledge and Rich Pedaogical Skills

Examples of Teaching Practices	Core Pedagogical Approaches						
	Didactics Demonstration Modelling	Inquiry	Reflection	Simulation Authentic	Experiential Clinical Practicum	Self - Directed	Collaborative
GESL			●		●	●	●
Microteaching	●		●	●			
School Based Practicum		●	●		●		
Problem-based Learning		●	●			●	●
Case Studies		●	●				●
E-portofolio			●			●	
Blended Learning	●	●	●	●			
Role Playing	●		●	●	●		

Graduand Teacher Competencies (GTCs)

NIE's TE programmes provide the grounding for teachers to have a sound understanding of how learning can be enhanced with the adaptive and selective use of different delivery modes and learning tools in different learning situations. Based on an initial audit of current pedagogies used in NIE, various pedagogies have been found to be effective in helping teachers appreciate the various delivery modes, knowledge and tools that they can use in the context of the 21st century classroom environment. (Refer to Annex A on page 82)

Communication is the key to diffusing good pedagogical practices across faculty. To support this process, new platforms for learning and sharing will be created. These may take the form of learning communities, on-line portal, an annual Pedagogy Symposium as well as regular 'sharing days' where AGs can showcase their best practices and success stories. NIE will also seek to partner with schools or clusters to develop and test new pedagogical practices that enhance teaching and learning.

New pedagogical approaches – Integrating facilities design and technology to simulate school learning environments

MOE is currently taking a holistic approach to teaching and learning in schools by revamping classrooms to allow for more creative use of space as well as to provide more conducive environments for teaching and learning to take place. In tandem with these initiatives, NIE has also embarked on creating teaching facilities that are in line with the current trends in school classroom design to support pedagogical practices that will help achieve desired teaching and learning outcomes.

The Primary English Language (PEL) Classroom

The PEL Classroom (Figure 9) exemplifies for our student teachers what an engaging learning environment for primary school children should and can be. It is purposefully cheerful and welcoming to ensure that the students enjoy the process of learning. Immersion in rich print is critical for early literacy, so the room has a large collection of books (big books, small books, audio books), children's writing, posters and labels. Environmental prints (such as signs and directions) remind children that language is functional. Children learn to read from big books, and read to learn from the learning centres of Mathematics and Science, which are arranged to integrate seamlessly with English.
A smart board in the room demonstrates the use of current technologies in the primary classroom that can be useful in the teaching of reading and writing, where processes can be made explicit and visible as the teacher analyses and constructs texts for the class. In keeping with the English Language Syllabus 2010 that advocates a solid foundation of oral communication in the early years, a platform (complete with a simulated "Recording in progress" red light) offers an authentic context for show-and-tell and other oral activities. In addition, wireless headsets take the traditional "listening station" to a new level – not constrained by a tangle of wires, they allow children to listen to and engage with audio-texts anywhere in the classroom.

Apart from functioning as a "model" classroom, the PEL classroom is also a resource room for teachers. The room displays different types of easels so that teachers can decide which easel is best for their classroom. There are also different types of colourful puppets (hand, glove, finger, 3-in-1) against the backdrop of different types of puppet theatres. Each teaching resource in the room is there to illustrate a pedagogical principle. Even the frog that greets you as you enter and leave the room has been strategically placed to teach onomatopoeia as it greets you with a "croak".

The Teachers' Language Development Centre (TLDC)

The aim of the Teachers' Language Development Centre's new English Language Self-Access Centre (SAC) is to encourage student teachers to take an active role in improving their English Language skills through independent self-learning and peer-to-peer learning. The SAC's design concept (Figure 10) is that of a flexible and functional learning space, where form and design complement each other, and where technology is seamlessly integrated into all aspects of the centre

— recessed power outlet panels in the carpeted floor, inter-connected flat-screen display monitors, self-access libraries of both print and media reference materials, as well as wireless internet access create a purposeful learning environment that supports a range of mobile and digital learning technologies.

The space is divided into a number of different areas that support various facets of independent learning of language skills. The central area, which has a high-definition overhead screen projector, can be used for lectures, screening of movies, or teacher-led interactions. The concept of a lounge area with flexible seating also

enables student teachers to engage in informal small-group discussions. At one corner of the SAC, sound-isolated facilities are available for students to individually practise their pronunciation – these are equipped with computers pre-loaded with specialised software for oral language practice. SAC also boasts of three IT-enabled presentation and consultation areas, all fully equipped with flat screen high-definition television monitors. At the far right of the room, behind glass panels, is a presentation room fully equipped with a technology-enabled conference table and ergonomic chairs; while at the front are two small-group areas, both of which have flexible nested tables which can be placed together for large group conferencing, or set apart for smaller group discussions.

Along with SAC's creative and innovative use of space and technology is its equally important use of vibrant and youthful colours and design motifs that together create an inviting learning environment.

FIGURE 10.1: TLDC'S ENGLISH LANGUAGE SELF-ACCESS CENTRE SOUND ISOLATED FACILITY FOR ORAL LANGUAGE PRACTICE

FIGURE 10.2: TLDC'S ENGLISH LANGUAGE SELF-ACCESS CENTRE AREA FOR LECTURES OR TEACHER-LED INTERACTIONS

The design of these rooms and the available tools facilitate both teaching and learning. It also supports the use of innovative pedagogies while still allowing space for more traditional types of instruction. With more schools redesigning their classrooms to ensure a conducive learning environment for students, these facilities within NIE enable teachers to experience a simulated environment to inform their practice once they transition to schools. Given the advantages that these new approaches have offered, more of such simulated classroom environments will be created in future.

Collaborative Tutorial Rooms

Collaborative Tutorial Rooms (Figure 11) that are being designed parallel classrooms found in some schools. They provide a learning space for teachers that allow them to conduct collaborative activities and facilitate the use of technological tools for learning while still maintaining an atmosphere conducive for class-wide discussion and sharing.

FIGURE 11: COLLABORATIVE TUTORIAL ROOM

Overview of the Design Concept

- Furniture that can be flexibly arranged to facilitate groupwork
- Amenities that allow for convenient use of IT equipment such as laptops
- Availability of LAN or wireless connectivity

Annex A

I. Examples of pedagogical practices used in NIE programmes:

Blended learning in NIE

Data collected from NIE's learning management system, Blackboard (BB), shows a progressive increase in the use of technology for e-learning. Campus wide e-learning weeks have been conducted since 2007 and this initiative has helped build faculty's confidence in using e-platforms for teaching. Lecturers are moving towards a more constructivist approach where students pull and construct knowledge rather than relying on the lecturer as the only content provider. Based on the latest figures for 2008, more than 90% of courses used BB, more than 80% used the e-mail features to communicate with their students, and about 33% used discussion forums in their e-learning modules. About one third of the courses used the assessment features of BB.

The Bachelor of Education (BEd) programme has blended components where about 50% of the courses are delivered through e-learning. The January 2009 PGDE intake students were exposed to wiki approach for their GESL courses and were required to use this platform for their collaborative work. The July 2009 intake will be required to use wiki for their GESL collaboration.

Use of videos as analytical tools

NIE has an established practice of using video-based teaching for micro-teaching. This can be further improved by using locally-produced videos of classroom instances to help students teachers understand the realities of the classroom. The option of streaming the videos online via the BB and interspersed with learning activities using the anchored-based learning model is being explored. Such videos can be used in a diverse range of teaching processes such as classroom management practices, questioning techniques, teaching complex and/or intangible concepts and for demonstration purposes, such as experiments in the science laboratory. Videos also allow students to dissect events and reflect on each one in turn, providing time for reflection and dialogue with peers and facilitators. Doing this in an on-line setting saves limited class time as reflections can be done anytime and anywhere. Lecturers can then draw on these online reflections to conduct higher order activities in the next classroom session.

Knowledge building community

Student teachers form knowledge building communities to enhance their knowledge – both practical and theoretical knowledge into learning communities. Within a learning community, there will be intense sharing of tacit knowledge and experiences and a good platform for linking theories and practice. A small number of NIE faculty have used this platform, *Knowledge Forum*, to facilitate knowledge construction processes with our student teachers.

Experiential learning and authentic materials

Experiential learning based on Kolb's four-stage learning cycle[27] allows our student teachers the experience of learning beyond the textbook materials. In this approach, student teachers go through a learning cycle which requires them to:

- have a concrete experience of the activity;

- reflect on the learning in the activity;

- connect the learning to a model that they can use in the future; and,

- plan how this model can work when they are in the schools teaching the pupils.

This experiential approach is used quite widely by NIE lecturers in the curriculum studies courses.

Reflective learning

Reflective learning is another approach which has its strong proponents within the academic fraternity in NIE and which will be scaled up in the future. Reflective practices appear to be more commonly associated with the use of e-portfolios where student teachers record and keep a profile of their reflections and learning. Moving forward, NIE will be exploring the use of e-portfolio approach in the ITP programme.

II. Curriculum and Programmatic Innovations

MOE has recently unveiled several initiatives aimed at strengthening the quality of education in our schools, namely :

- Curriculum 2015 (C2015);
- Primary Education Review & Implementation (PERI) Committee;
- IT Masterplan 3;
- Upgrading of English Language (EL) oral proficiency for all English medium teachers; and
- Soft Skills development.

NIE has been responsive in collaborating closely with MOE in aligning and enhancing curriculum, pedagogical and assessment practices. The following examples exemplify how ongoing TE programme development and innovation is in coherence with these recent policy initiatives.

III. Programme development work that has taken place in the last 12 months

Example 1: Craft Knowledge (CK)

This track has been introduced for PGDE (1 CS Specialisation) programme since July 2008. CK courses will provide student teachers with a structured framework for an educative school experience to understand theory-practice links through reflections and sharing within a learning community. Student teachers gain higher level practical theorising which require critical analyses of field experiences using sound theoretical frameworks. They acquire the commitment, confidence, analytic abilities and skills to be able to critically reflect, theorise and develop their craft knowledge and skills.

Example 2: PGDE Junior College (JC) Track.

The first intake for the PGDE JC track of 191 student teachers was admitted in July 2009. Courses are designed to equip student teachers to be more informed, reflective, adaptive and innovative in their teaching and mentoring competencies. For example, student teachers will undergo some school experience at JC (observing or teaching classes) as part of their CS courses.

IV. C2015 Desired Student Outcomes

The C2015 committee has articulated a set of student outcomes which focus on the requisite 21st century skills which students will need to function effectively when they join the workforce. Students will need to combine high concept and high touch capacities with high levels of alphabetical, digital, and scientific literacy and numeracy, as well as highly developed personal, interpersonal and aesthetic sensibilities. A set of principles to guide the learning process, specifically, *what* and *how* to learn is listed below[28] :

1	Strong Fundamentals	High standards of knowledge, skills and values in areas such as Languages, Math, Science, Humanities and Physical Well-being
2	Future Orientation	Curriculum is reviewed on a regular basis and incorporates future learning for students to live and work as fully-functioning adults
3	Broad-based and holistic curriculum	Students access learning in the cognitive, moral, social, physical and aesthetic domains
4	Finer customisation of learning	Curriculum, pedagogy and assessment are customised according to students' profiles, interests and abilities and talents so that they can maximise their individual potential
5	Challenging and enjoyable learning	Learning is a positive and fulfilling experience for all students as they learn in and outside the classroom. Strong student-teacher relationships are expected and the curriculum stretches capable students and scaffolds less able students to enable them to experience success.

Based on these broad overarching principles, key recommendations were made in the areas of curriculum, pedagogy and assessment. Table 9 summarises the main recommendations of the C2015 and NIE's programme development work which has taken place in tandem with these recommendation as well as the concurrent programme review and enhancement process.

Curriculum	
C1 – Provide strong foundation through the national curriculum.	The revised Values, Skills, Knowledge (VSK) Model – the **V³SK**, which is the framework for nurturing the desired attributes of a teacher, has been articulated to ensure that the underpinning philosophy guiding the design, delivery and continual enhancement of NIE programmes are grounded in the fundamentals that are geared to prepare our teachers to lead in the 21st century classrooms. The V³SK is also embedded in the Graduand Teacher Competencies and it is through that embedding that the strong foundation through the national curriculum will be reflected in NIE's ITP programmes.
C2 – Develop a C2015 curriculum framework.	Curriculum coverage and delivery of ITP programmes will be mapped into the C2015 framework. The V³SK and the GTCs collectively represent a 2015 curriculum framework for teacher education.
C3 – Decentralise curriculum for greater currency and differentiation.	The GTC 'quality learning of pupils' anticipates that our graduates will be aware of the need to provide greater currency and differentiation and have developed capacities that enable them to make a positive contribution to this goal.
C4 – Create a pervasive e-culture in schools.	NIE will exemplify and model effective and innovative pedagogical practices in our programmes. The Pedagogies strategy will involve scaling up effective e-pedagogies.
Pedagogy **P1 – Provide support for schools to use a wider variety of pedagogies**.	A central challenge will be to highlight the best pedagogical practices and to model these to the teachers in NIE programmes. The goal is to broaden and deepen pedagogical repertoire.
P2 – Integrate technology in the learning process.	Under the GTCF, 'Quality learning of pupils' has this goal in mind specifically in the area of 'Teaching for learning'. NIE will work with MOE to integrate technology in the learning process in our ITP and professional development programmes.
P3 – Build pedagogical knowledge through research.	NIE will be embarking on a research project entitled: **Building an Evidence-base for ITP in NIE.** The core aim of the project is to initiate a programme of research activities that contribute to a systematic, institute-level development of a rich and contextualised understanding of the nature, substance and professional impact of student teachers' learning within NIE's ITP programmes in order to provide an evidence-based means by which to review and enhance their core assumptions and processes.

Assessment **A1 – Maintain standards and benchmarking through national assessment.**	NA
A2 – Develop a C2015 assessment philosophy and framework.	NIE will be implementing portfolio assessment as a tool to monitor programme-level learning achievement, and to validate graduand's achievement of the GTCs. In addition, a proposed set of assessment competencies will be developed for ITP and TPD programmes.
A3 – Assess C2015 skills and mindsets.	An Assessment Competency Framework (ACF) which can be applied for both ITP and TPD is in development. Its aim is to define to what extent teachers need to be prepared to understand and utilise assessment as an integral aspect of teaching/learning. A consequence of recommending that student teachers should be able to situate assessment items in authentic contexts and to be able to use alternative assessment modes is that our student teachers need to be experiencing these modes and practices of assessment themselves.
A4 – Leverage technology for assessment.	A key development in this direction is the adoption of an *e-portfolio* approach.

Primary Education Review & Implementation (PERI)

Another recent initiative is from the Primary Education Review & Implementation (PERI) Committee.

Table 10 summarises the main recommendations of the PERI committee and the equivalent mapping of programme, curriculum and pedagogical changes to be implemented by NIE.

TABLE 10 : MAPPING OF NIEs PROGRAMMATIC & CURRICULUM DEVELOPMENTS TO THE PERI COMMITTEE'S RECOMMENDATIONS

S/N	Recommendations	NIE's Programme Development Work
Balancing Knowledge with Skills and Values		
1.	More engaging teaching methods • Strengthen training of teachers in content mastery and teaching methods • Train and deploy teachers so that they specialise in teaching certain subjects at the upper primary level	Both content and pedagogical preparation for student teachers will be strengthened. This will be addressed through the GTCs and new pedagogies.

S/N	Recommendations	NIE's Programme Development Work
2.	New Programme for Active Learning (PAL) • Greater exposure for all P1-2 pupils to Sports and Outdoor Education and Performing and Visual Arts for well-rounded education, 2 hours curriculum time per week (modular) • P3-6 pupils may continue with programme or opt for elective CCA • More resources for schools to conduct PAL	The student development programme will be revamped to make it more structured. The GTCs and portfolio assessment will allow both student teachers and NIE to track their co-curricular activities record.
3.	Holistic Assessment to Support Learning • Qualitative feedback on skills and non-academic areas • 'Bite-sized' topical tests in P1-2 • Train teachers to employ a range of assessment techniques and in giving feedback	The ACF will provide a central focus in achieving these objectives.
Providing More Resources for Quality Primary Education		
Quality Teaching Force		
4.	Provide Additional Manpower • As part of plans to bring forward hiring plans for teachers and Allied Educators, recruit and train more PE, Music and Art teachers • Engage individuals with strong oral language competencies as language or speech and drama instructors	NA
5.	Recruit passionate, quality educators • Continue to select firstly for passion and aptitude to teach • Recruit new teachers from pool of university graduates or those who qualify for an undergraduate education by 2015 • A-level and diploma holders can join the teaching service through NIE's BA/BSc degree programme • Alternatively, they can join as Allied Educators (Teaching and Learning) and upgrade qualifications to become teachers if found suitable	The V^{3}SK model has teacher passion and aptitude as core attributes of NIE graduates. To attract the best and the brightest to the teaching profession, accelerated pathways leading to a Master's degree have been proposed.
6.	• Ensure continuous professional development of teachers	• The PRE Report is premised on the notion of teacher education and therefore learning as a continuum.

S/N	Recommendations	NIE's Programme Development Work
Enhancing Infrastructure		
7.	All primary schools to become single-session to support above goals • Government schools by 2016 • Facilitate the transition of government aided schools at a pace comfortable to them • Ensure that all primary schools, especially the more popular ones, maintain a sufficient number of places such that students who have no affiliation to the school can still have access for admission to P1	NA
8.	Schools have flexibility to adjust start and end times • MOE to work closely with LTA on school bus transportation issues • Number of school hours primarily determined by educational goals e.g. not full-day schools	NA
Enhancing Infrastructure (contd)		
9.	Design new generation school facilities	NIE's facilities upgrading programme will focus significant attention on re-designing teaching facilities and classrooms to support pedagogical practices that will help achieve desired teaching and learning outcomes.
10.	Provide more space to support Student Care Centres especially for pupils from disadvantaged families.	NA

Masterplan 3 (mp3)

Another key initiative which NIE will focus on is Masterplan 3 (mp3) which aims to build on what mp1 and mp2 have achieved. mp1 may be seen as laying the foundations for the use of ICT, while mp2 strived for a more pervasive use of ICT in education. mp3 aims to use ICT to improve learning outcomes. The articulated vision for mp3 is: 'harnessing ICT, transforming learners.' Table 11 shows the main goals of mp3 and the corresponding NIE programme development work.

TABLE 11 : MAPPING OF NIEs PROGRAMMATIC & CURRICULUM DEVELOPMENTS TO MP3

	mp3 recommendations	NIE's programme development work
1	Equip students with critical competencies and dispositions to succeed in a knowledge economy e.g. self-directed learning	The Graduand Teacher Competencies Framework and the Pedagogies Strategy & Framework articulate how this issue will be addressed in the ITP programmes.
2	Tailor learning experiences according to the way that each student learns best: train pool of ICT specialist teachers with strong pedagogical groundings to model and lead professional develop efforts within and across schools.	NIE will create platforms and communities of practice for the sharing of best pedagogical practices and scaling up these practices institute-wide.
3	Encourage students to go deeper to advance their learning: to produce more authentic reconstruction of events	Redesign of teaching facilities and application of a wider repertoire of pedagogical approaches are the key means of simulating various classroom environments.
4	Learn anytime, anywhere: Free from the physical confines of the classroom	Same as above. Learning situated in authentic situations can be scaled up.

English Language Proficiency

In June 2009, an English Language taskforce was set up, and co-chaired by Director/ Curriculum Planning & Development Division, Mdm Low Khah Gek and Director/ Training & Development Division, Mr Winston Hodge, with Director-General of Education, Ms Ho Peng as advisor. The aim of the taskforce is to look at an end-to-end approach in raising the EL oral proficiency of all English medium teachers from the pre-service stage to their professional development phase. NIE is working closely with this taskforce, through our representative, A/P Lubna Alsagoff, Head, English Language & Literature AG.

TABLE 12 : NIE's RESPONSE TO RAISING THE ENGLISH LANGUAGE ORAL PROFICIENCY STANDARDS

MOE's EL proficiency taskforce recommendations	NIE's responses
Enhance and improve the EL oral proficiency of all English medium teachers from pre-service to professional development	Proposal 1 : To re-develop the current English Entrance Proficiency Test (EPT) as a placement test to determine which student teachers entering NIE will require additional EL oral proficiency development. Such a development will likely entail NIE mounting an additional lab-based pronunciation improvement courses currently proposed at 22 hours. Proposal 2: To have an exit oral EPT to determine if student teachers will require further oral proficiency upgrading when they are in-service. The oral EPT will also be used to incentivise those graduating teachers who score strongly for their oral EPT. The exit oral EPT will also identify those who still require further upgrading. MOE will look into offering more subject-specific EL upgrading in-service courses (for example EL for Mathematics teachers, etc) to ensure relevance to their teaching.

Important Note: As of 11 August 2009, the taskforce has not as yet finalised its recommendations. What is stated here are the key recommendations that have been discussed, and have received general consensus among the taskforce members.

Soft Skills Development

A complementary development which follows in the wake of key initiatives directed at providing holistic education such as C2015 and PERI is the call for a strong emphasis on soft skills development. NIE is collaborating with MOE in developing a programme to address these concerns.

TABLE 13 : NIES RESPONSE TO STRONGER EMPHASIS ON SOFT SKILLS DEVELOPMENT

MOE's focus on Soft Skills Development	NIE's programme development work
One of the key issues in soft skills development in pupils is the need to make explicit the delivery of core values and competencies in pre-service teacher training. This is to ensure that all teachers are adequately equipped with the knowledge, attitudes and pedagogical skills to teach core values and competencies.	NIE's current framework for soft-skills development in our student teachers is mainly through: (i) The **formal curriculum**: where specific core courses (such as the ES courses) focus on developing particular domains from the SEL framework (ii) Through **infusion** in the formal curriculum: where other programme components (such as CS courses) infuse the development of soft skills in their course curriculum (iii) Through **experiential learning**: such as the field experience (Practicum), the compulsory service-learning projects (GESL), and the newly launched Meranti Project in 2009 which aims to help student teachers' tune into self, deepen their commitment towards teaching, better develop their awareness of National Education, etc. (iv) Through **role-modelling by award-winning faculty members**. (v) Proposed new approach: **a train-the-trainer package for NIE's pre-service curriculum.** The content will focus on Civics and Moral Education and SEL competencies and the key pedagogical approaches necessary for the delivery of these values and competencies. This package will be implemented from January 2011. (vi) Other measures: **fireside chats** will also be organised for student teachers to listen to and be inspired by guest speakers. The role of the GESL facilitator may also be extended to that of a **'life-coach'** for students in their group.

RECOMMENDATION V:
Assessment Framework for 21st Century Teaching and Learning

RECOMMENDATION V:
Assessment Framework for 21st Century Teaching and Learning

In the context of teacher education, NIE programmes must emphasise **assessment of learning**, that is, assessment for the purposes of attributing grades to students and reporting for institutional purposes, and **assessment for learning**, where the purpose is to "enable students, through effective feedback, to fully understand their own learning and the goals they are aiming for"[29].

Increasingly, more attention is being paid to the importance of assessment. MOE is looking at refining the examination and assessment landscape in Singapore schools[30] by:

- Balancing assessment *of* learning with assessment *for* learning

- Rebalancing learning of content knowledge and development of skills

- Develop intrinsic motivation through excellence against defined standards

- Building capacity of schools and MOE in assessment literacy

*ASSESSMENT **OF** LEARNING AND **FOR** LEARNING*

It is therefore imperative that teachers also raise their assessment literacies to better support and implement a more balanced assessment system. The stronger their assessment competencies the better they are able to assess and provide feedback to students. In terms of enabling tools, the MOE mp3 emphasises the need for new innovative technologically friendly assessment techniques which can provide timely diagnostic feedback to enable teachers to guide learning, and to students to guide their learning goals.

To equip teachers for our schools, NIE must reflect the changing role of assessment and model good assessment practices by using appropriate and effective assessment tools in our teacher education programmes. Recommendation V involves developing an Assessment Framework for 21st Century Teaching and Learning, which will enable us to produce teachers who have high assessment literacy levels and who are able to adopt the best practices to effectively evaluate student outcomes.

The central piece of this NIE Assessment Framework is a **defined set of assessment literacy outcomes.** It also provides the mechanism for the following key enabling processes:

- Mapping of existing assessment practices against the various courses offered in NIE
- Evaluating and validating their effectiveness against the assessment literacy outcomes
- Providing learning and sharing platforms to facilitate dissemination of good practices
- Systematic scaling up of effective practices institute-wide
- Capacity building in assessment literacy development for faculty
- Developing new practices that expand the range of assessment tools that teachers experience in the programmes

One of the new assessment approaches that is currently being evaluated is the **e-Portfolio**. A phased implementation approach will be taken to scale up use of portfolio both in ITP and the MTeach programme.

Current Assessment Practices in NIE

NIE has been employing diverse forms of assessment, including performance assessment, portfolios, learning logs, self-assessment, peer assessment, group-work assessment, and oral/poster presentations. While audits of the types of assessment modes as well as the spread of assessments within ITP programmes have up till now included only summative assessment practices and tasks, future audits will be expanded to capture formative assessment ideas and/or feedback techniques. Regular audits of assessment practices will also be extended to the TPD programmes.

Assessment activities can be broadly divided into four categories namely Reflections, Practical Assessments, Exams/Tests and Analyses/Syntheses. Table 14 provides the four assessment modes and examples of assessment activities.

Types of Assessment Modes	Examples of Assessment Activities/Tasks
Reflections To develop the capacity for self assessments for reflective and self directed learning	• Reflection Logs • Journals • Case Studies • Portfolios
Practical Assessments To apply theoretical concepts in simulated/ actual classroom situations	• Micro Teaching • Field Trips • School based practical assessments • Classroom activities
Exams/Tests To gauge the competence level in theoretical foundations and content knowledge	• Exams • Tests (Summative and Formative) • Paper and Pen Assessments
Analyses/Syntheses To strengthen theory-practice linkages	• Unit and Lesson Plans • Research Papers • Class Tests – Analysis of Test Items • Role Plays/Simulation Packages

Current Assessment Literacy Development in NIE

An assessment literacy survey was conducted in June 2009 for graduating student teachers from the PGDE, Degree and Diploma programmes (they would have learnt and practised assessment throughout their ITP programme in the ES/CS and Practicum). The 2-part, 12-item survey instrument was a self-evaluation tool on the graduating student teachers' perception of their level of awareness of assessment in teaching. For the purpose of this survey, assessment literacy was defined to be a composite of assessment knowledge (e.g. principles and other theoretical assessment constructs) and practice (actual manifestation of assessment skills in the school/classroom context). It was found that students of Humanities and those in Art/Music were less confident of their assessment knowledge compared to those in Maths and Science. Assessment practices of CS1 subjects were more varied in scope and quantity than CS2.

Assessment Competency Framework

Given these findings, and the growing significance of assessment literacy for 21st century teachers in Singapore, it is essential that NIE commits to a *defined set of assessment literacy outcomes* to guide our work in teacher education. This set of outcomes is referred to as the Assessment Competency Framework (ACF). An outline of the ACF is shown in Figure 12.

The framework is not designed to generate an exhaustive list of outcomes but consists of key elements of assessment competencies for effective teaching and learning in schools. The seven competencies are[31]:

• Designing assessment methods appropriate for instructional decisions

• Planning assessments as part of an effective teaching learning process

• Understanding and communicating the goals and criteria of assessments

• Developing capacity for self assessment for reflective and self-directed learning

• Providing feedback to the learners to improve

• Administering, scoring and interpreting the results effectively

• Recognising unethical, illegal and inappropriate assessment practices

By specifying entry-level competency requirements, the ACF supports the concept of learning as a continuum that begins in an ITP setting and continues with life-long professional education and experience. The ACF will ease the transition from that of a student teacher to being a teacher of students. As assessment forms one subset of the competencies that we expect all NIE graduands to possess, all ITP-level competencies under this framework are subsumed under *Quality Learning of Pupils – Monitoring and Assessing Learning* in the GTCF.

To support the concept of learning as a continuum, the seven competencies identified in the ACF are arranged under the following three categories to assist teachers in knowing the standards and for them to take charge of their own professional growth.

- Knowledge, Comprehension & Practice : ITP
- Application & Analysis : Beginning Teacher : 1 – 3 years of service
- Synthesis & Evaluation : Experienced Teacher

The framework should be viewed as a set of building blocks and best practices to be modified, shaped and integrated in the learning, teaching, and assessment process. It also provides the mechanism for filling the assessment information gap by defining an assessment vocabulary and establishing a set of assessment competencies for teachers, both at ITP as well as in TPD.

FIGURE 12: ASSESSMENT COMPETENCIES FRAMEWORK
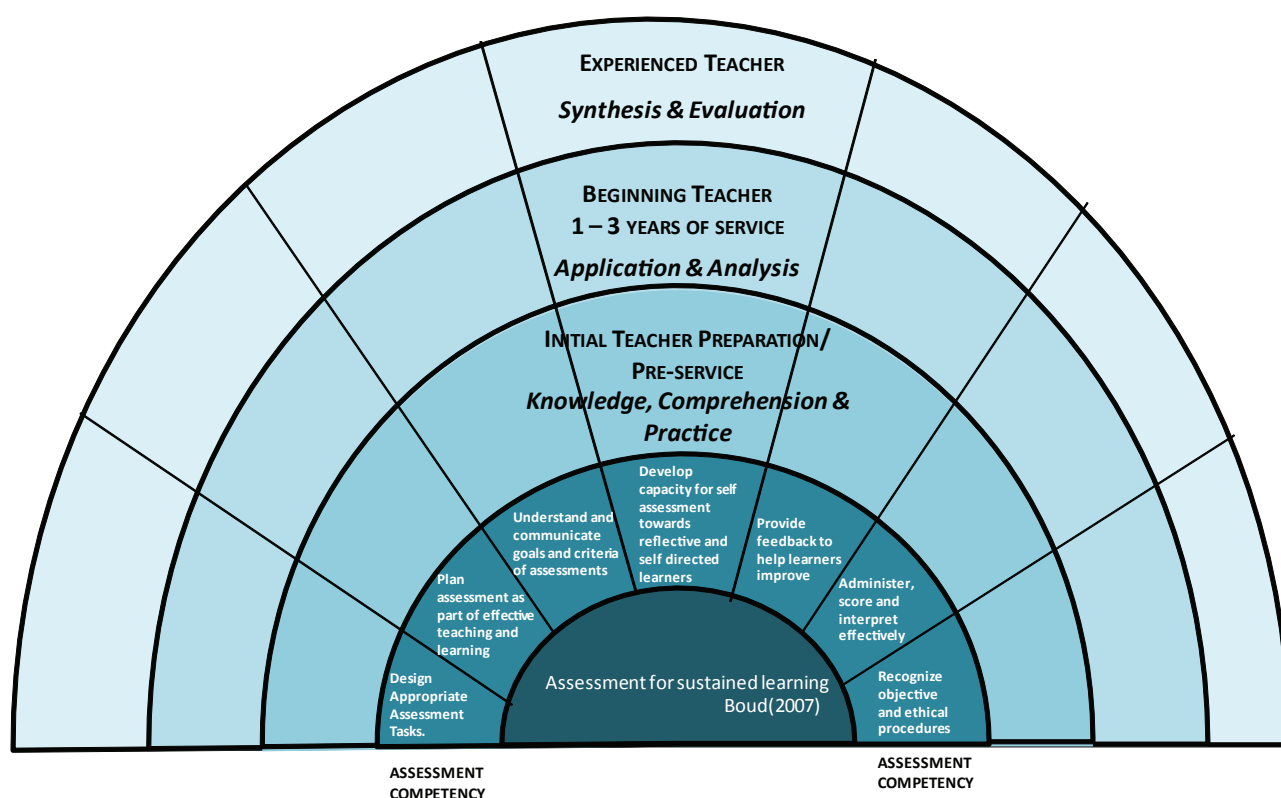
To raise the assessment literacy of our teachers, the competencies will be embedded within NIE's curriculum. Beginning with ITP programmes, the CS/ES and Practicum will be refined to enable student teachers to further develop their skills in assessment and make them school-ready. These competencies will also be strengthened at the TPD level in a systematic and developmentally appropriate way.

NIE's educators also need to model best assessment practices to impact on teachers' learning. They will need to achieve the 'experienced teacher' level of assessment competence to credibly transfer the corresponding skills and knowledge to teachers. A range of staff development opportunities will be provided for adequate and progressive assessment literacy development for faculty as part of a planned professional development strategy.

Portfolio Assessment

Portfolio assessment is being increasingly used in ITP programmes at Stanford University, Alverno College, the Hong Kong Institute of Education, to name a few. Much of the contemporary literature on improving teacher education focuses on the use of portfolio assessment as a means of addressing the challenges of assessment. As portfolios involve documentation of programme-level learning along the breadth and duration of ITP, they have particular value in circumstances where learning objectives are addressed in multiple courses rather than within discrete courses, as will be the case with the GTCs. They also have added value when they are able to draw upon self, peer and expert judgements about the quality and credibility of the claims of achievement of those learning objectives and evidence for those claims. This value arises because of the opportunity that portfolios provide as foci for conversations about the degree to which the evidence demonstrates an author's thinking about their professional identity, specific practices and their outcomes, and expectations of the quality of that thinking[32]. As such, the process of judgement making and justification assist in the articulation of a shared language of expectations and interpretations.

Professional portfolios can draw on different kinds of papers, projects and other forms of learning and assessments, allowing students to choose those that reflect the range of expected competencies. A number of these artefacts can have been evaluated by internal as well as external examiners prior to their inclusion in the portfolio. For example, graded assignments and quizzes can be included. On the other hand, video-based artefacts can help pre- and in-service teachers reflect on authentic experiences, identify strengths and weaknesses in their teaching, and implement changes in practice[33]. This can be done via e-portfolio artefacts which provide different points of view on the achievement of particular competencies. Thus, assessment portfolios can facilitate professional growth, enhance reflection and improve practice over time[34].

Hence, portfolios can incorporate dynamic assessment strategies and as a result, exemplify assessment **as** learning and not just **for** learning.

What might portfolio assessment involve?

First, assessment is 'of something'. In relation to this, there is a need to distinguish between a 'portfolio', understood as a collection of artefacts (whether that collection be electronic, or physical, or a combination of the two), and portfolio assessment, where the focus is on judgment of the quality of a candidate's response to a set of criteria (or GTCs), which is in turn linked to a set of artefacts seen as validating or validating the claims that a candidate makes in relation to each criterion (or competence).

Second, assessment involves the making of a judgement as to the quality of 'the something'. Portfolio assessment invites the use of multiple perspectives – self, peer and 'experts' – with the opportunity to make comparisons between those judgements, and to make those judgements collaboratively.

Third, the process of assessment should be structured in terms of both the preparation of 'the something', in the making and justifying of the judgement as to quality, and the feedback on that judgment to the candidate.

Phased Implementation Approach for Portfolio

The achievement of these outcomes requires considered design of both the professional portfolios and the processes through which they are assessed. NIE is exploring the use of portfolio as a means to bring together teaching, learning and assessment in meaningful ways. Portfolio assessment is essentially targeted at developing the reflective teacher. For ITP, it is likely to form a significant part of the practicum assessment, the grading of which will have to be jointly undertaken by the NIE supervisor together with the cooperating teacher at the school end. The portfolio-based approach is also meant to be applied for the assessment and validation of graduates' achievement of the GTCs. A staged implementation will involve piloting the portfolio with either the January 2010 PGDE or the July 2010 (JC) intakes. It is likely that the portfolio will be digitally housed as an e-portfolio and AGs will be encouraged to include reflective assignments as part of their course assessment. In this way, the progress of the portfolio can be monitored by academic staff from various AGs at different times.
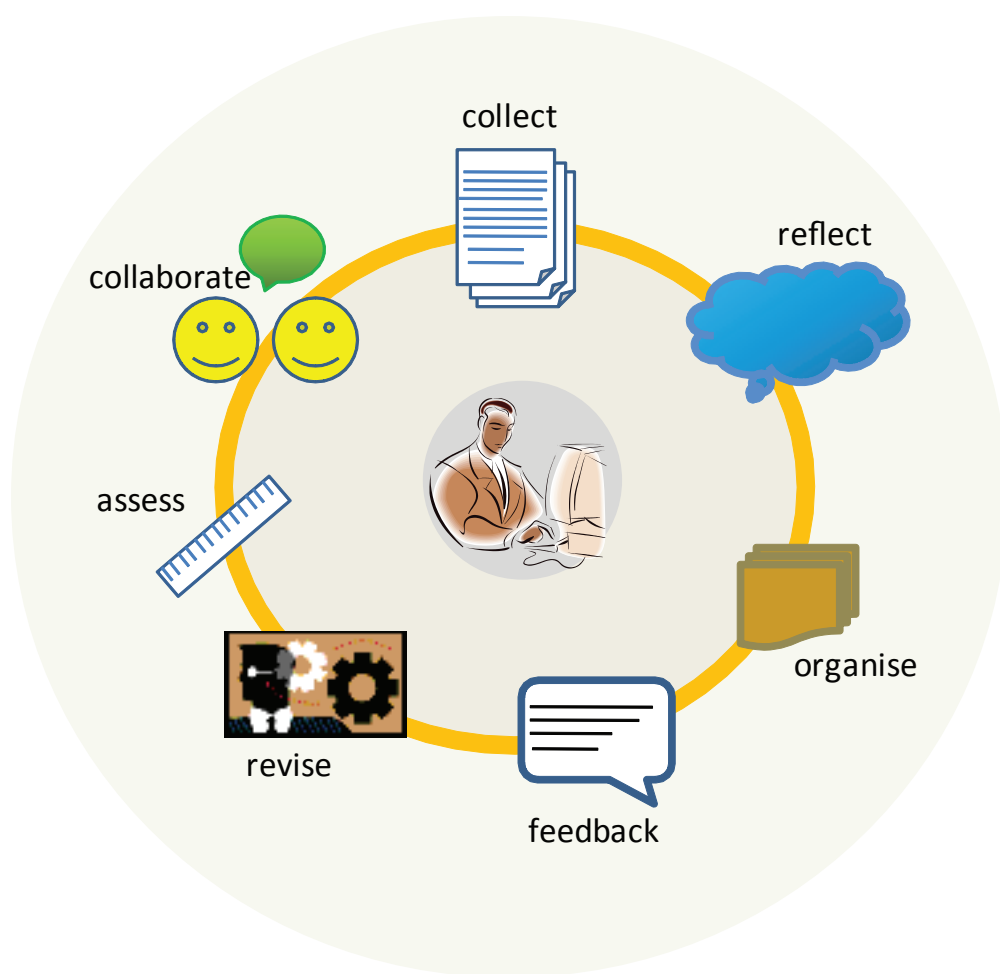
For TPD, in the soon-to-be launched Master of Teaching programme, where candidates are required to undertake a Professional Inquiry Project (PIP) as a graduation requirement, one component of the assessment for the PIP is a professional portfolio. This will focus on answering selected questions of practice and it should provide evidence of the candidates' abilities to appraise, transform, create and apply knowledge, conduct systematic and rigorous practice-related inquiries, as well as provide leadership in strengthening and initiating communities of practice. The professional portfolio will also include a critical reflection of the candidate's professional learning through the programme accompanied by individual pieces of work he/she has produced in one or more modalities.

Annex B :

Examples illustrating advice to candidates on what to include, and how to structure their portfolio.

Example 1: Advice to Candidates

Your Professional Portfolio should include:
- a Personal Statement
- your Personal Learning Agenda
- an Overview of your capacity development
- evidence to support the claims you make concerning that development

The Personal Statement should include:
- My rationale for being a teacher
- Expectations of the learning journey in NIE to help me achieve this rationale

Your Personal Learning Agenda should:
- indicate specific areas of focus in ES or CS for your learning – past, present and future
- provide a rationale for the area/s selected for focus
- indicate progress with and plans for that agenda

The Overview of your capacity development is a review of your progress and development based on the reflective teaching model.

In selecting evidence to support your claims of development you should present a small number of high credibility artefacts. In selecting artefacts you should consider their relevance to your own learning journey. The artefacts should:
- be directly relevant to your learning
- be diverse
- reflect the breadth of your learning

Artefacts include:
- reflections on specific CS and ES issues (see 2 examples below)

- reflections for every APT during practicum

Artefact Example 1: Curriculum Studies in Mathematics

Observing
Lecturer explains why $10^0 = 1$ by inserting 1 as the 'base' number. Thus, 10^3 may be interpreted as $1 \times 10 \times 10 \times 10$ and this follows that 10^0 means 1.

Reflecting
Not convinced as inserting 1 seems artificial (knowledge of context). Recall also that teacher in secondary school said that it was 'by definition'.
Question: What is 'definition' in mathematics? It seemed arbitrary and unsatisfying back then (knowledge of self). Read up on definitions in mathematics. See attached:

Tay, Y. C. (2004). What should computer science students learn from mathematics? In *Proceedings of the 9th Asian Technology Conference in Mathematics*, 38-51. ATCM, Inc., USA.

Usiskin, Z. (2008). *The classification of quadrilaterals: a study in definition.* Information Age Publishing Inc.: USA.

Planning
Will teach $10^0 = 1$ only after explaining how definitions arise in mathematics. Start with one aspect

of definition which is 'as notation'. Thus, $10^n = \overbrace{10 \times 10 \times \ldots \times 10}^{n \text{ terms}}$ as notation for succinctness. Note that notation works only when n is a positive integer. Work out the logical laws that follow from the notation: $10^m \times 10^n = 10^{m+n}$ and $10^m \div 10^n = 10^{m-n}$. Show that $1 = 10^m \div 10^m = 10^{m-m} = 10^0$, but that 10^0 is not defined yet. Tease out the 'desired definition' of $10^0 = 1$ from the students.

Acting
Explain to classmate. Go back to the Reflective cycle. Keep in view for practicum.

Artefact Example 2: Educational Studies (Educational Psychology)

Reflection:
During my Educational Psychology I course today, I learnt about the psychology of the adolescent. Bearing in mind the psychosocial stage of my learner's development, some of their characteristics in terms of their personal, socio-emotional, moral and social development would include … These different aspects affect his/her learning in the following ways ….

Planning:
The knowledge of my learner's characteristics will influence my teaching and style of management in the classroom in the following ways...

Action:
During practicum, I carried out my lesson plans integrating the knowledge of the learner into my classroom teaching and I encountered the following results and obstacles …

Reflection:
(student teacher will continue to reflect on how he/she needs to modify his/her lessons for effective learning to take place)

RECOMMENDATION VI:
Enhanced Pathways for Professional Development

RECOMMENDATION VI:
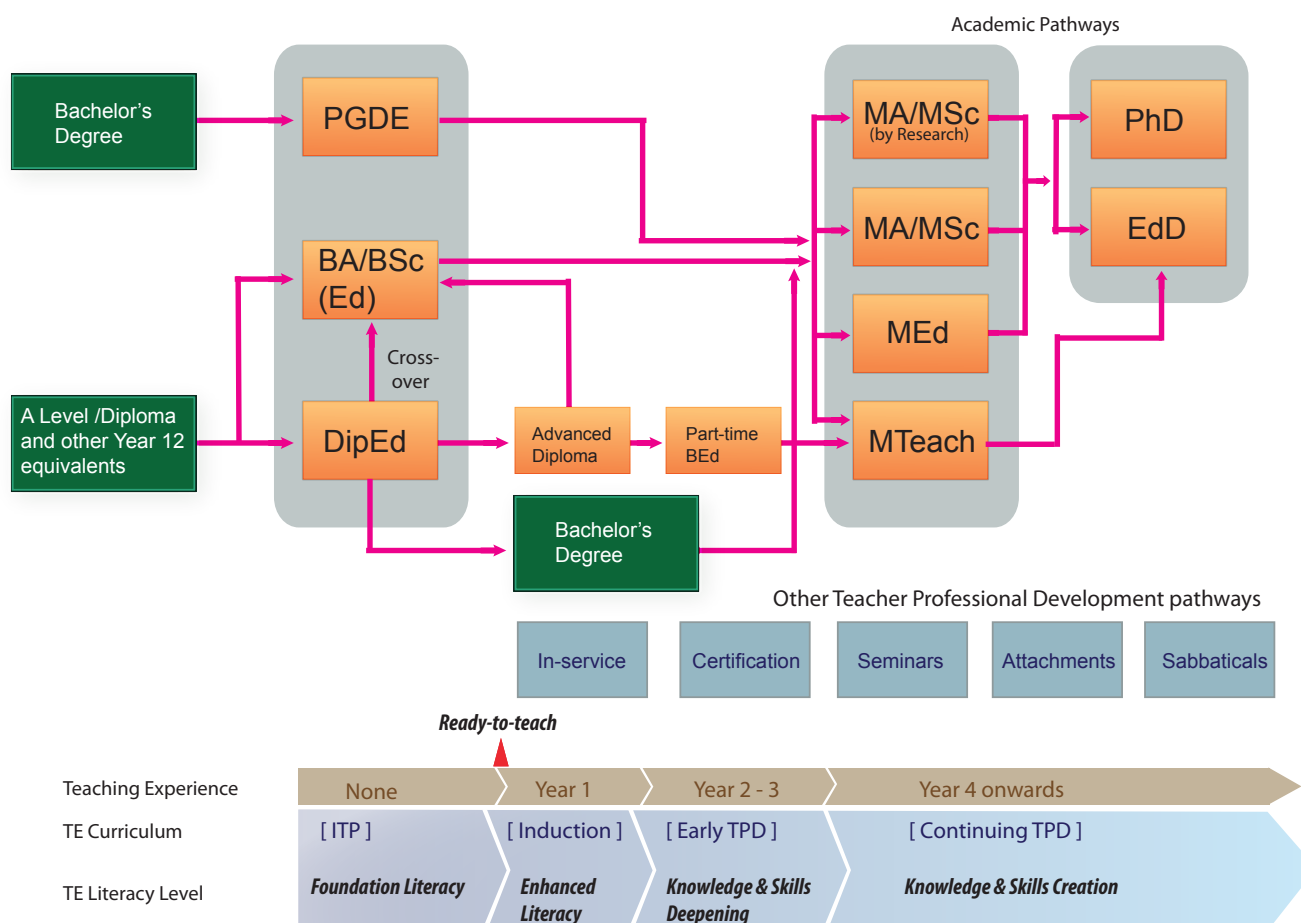## Enhanced Pathways for Professional Development

A pathway is defined as a sequence of programmes created to enable teachers to make informed decisions about learning options so as to achieve their academic and professional aspirations. At NIE, the pathway begins with an initial teacher preparation certification, and could culminate in a doctoral qualification. While formal academic progression is subject to teachers meeting specified admission requirements at each stage of the pathway, a teacher's lifelong learning journey may also entail various alternative options for professional upgrading. These can include in-service short courses, certification courses, industry attachments, and sabbaticals, to name a few examples. Figure 14 shows the NIE Pathways model, from ITP programmes, which includes the Bachelor's degree programme and the PGDE programme, to TPD which includes the Masters' and Doctoral programmes. The most recent enhancement to NIE's academic pathways is the MTeach which will be launched in AY2010.

*TEACHING AS
A LEARNING
PROFESSION*

In Recommendation VI, NIE is proposing to explore accelerated pathways, which will lead from an ITP programme to a Masters degree.

FIGURE 14 : TEACHER EDUCATION PATHWAYS

Academic Pathways

| Bachelor's Degree | → | PGDE |

BA/BSc (Ed)

Cross-over

A Level /Diploma and other Year 12 equivalents → DipEd

Advanced Diploma → Part-time BEd

Bachelor's Degree

MA/MSc (by Research)

MA/MSc

MEd

MTeach

PhD

EdD

Other Teacher Professional Development pathways

| In-service | Certification | Seminars | Attachments | Sabbaticals |

Ready-to-teach

Teaching Experience	None	Year 1	Year 2 - 3	Year 4 onwards
TE Curriculum	[ITP]	[Induction]	[Early TPD]	[Continuing TPD]
TE Literacy Level	*Foundation Literacy*	*Enhanced Literacy*	*Knowledge & Skills Deepening*	*Knowledge & Skills Creation*

Accelerated Pathways

In order to attract the best and brightest to make teaching the profession of choice, it is necessary to improve the stature and professionalism of teachers. A comparative analysis of representative models and pathways in Teacher Education across the Asia-Pacific, Nordic, UK and North American regions indicate that in the best performing systems, the baseline academic qualifications for teachers is getting higher. Countries such as Finland require teachers to possess a minimum qualification of a Master's degree. In South Korea, the initial teacher preparation programme is being re-designed as a full Master's programme to promote reflexivity, develop research capacity and nurture an open attitude amongst teachers. In Australia, the University of Melbourne has introduced a 3-year Master of Teaching to address the

theory-practice gap and improve the competencies of students.

MOE itself has set an ambitious target for all-graduate recruitment by 2015. For the teacher education system in Singapore to become truly comprehensive and remain robust in its ability to produce high quality teachers, it is therefore imperative for academic learning pathways to be continually enhanced so that teachers are provided with more opportunities to enhance and upgrade their academic qualifications. Two options can potentially be explored to provide the top cohort of student teachers with an accelerated pathway to a Master's - one for the Postgraduate Diploma in Education (PGDE) and the other for the Bachelor's (BA/ BSc (Education) degree programme[35].

Two-year, Full-Time Masters Programme with a PGDE Exit Option

This pathway calls for the development of a new PGDE programme, which will offer four Master's level courses (Refer to Figure 15).

FIGURE 15: TWO-YEAR, FULL-TIME MASTER'S PROGRAMME WITH A PGDE EXIT OPTION
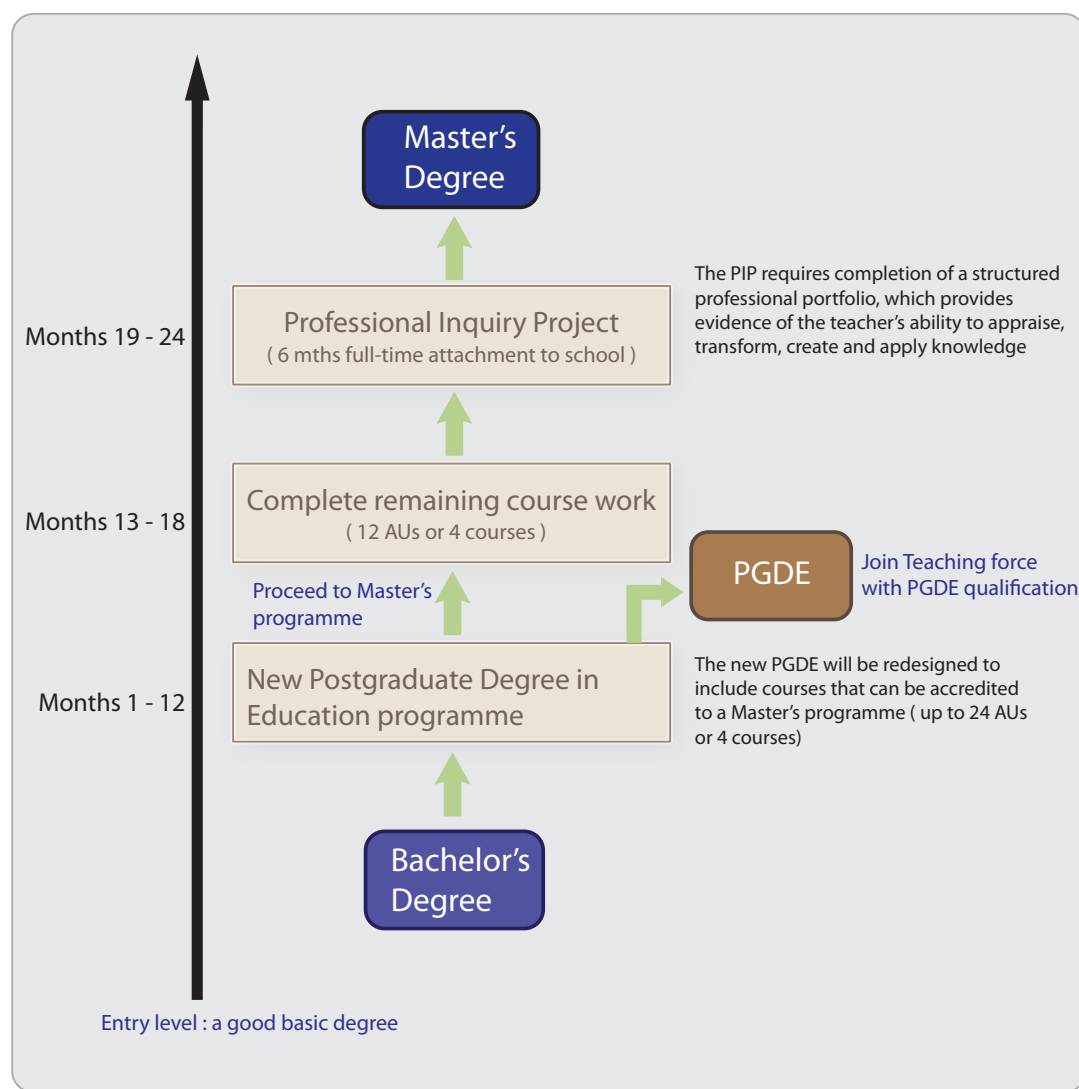
After 12 months, student-teachers obtain their PGDE teaching qualification. At this exit point, 90% – 95% of graduands will proceed to their school postings as Beginning Teachers. For the top 5% - 10% of the cohort who are selected to proceed to the Master's programme, a maximum of four courses (12 AUs) with at least a B-grade read in the PGDE programme would be accredited to the Master's programme. These student-teachers will remain on campus for another six months (from months 13 to 18) to complete another four courses (12 AUs).

From months 19 to 24, student-teachers will be attached to a school for the Professional Inquiry Project (6 AUs), while remaining as full-time graduate students of NIE/NTU. Guided professional reflections will allow student-teachers to trace the development of their own knowledge and the changes that result from the learning. The outcome of this learning will take the form of a structured professional portfolio through which student-teachers will provide evidence of their ability to appraise, transform, create and apply knowledge. By the end of the 24th month, student-teachers will submit their project. Conferment of the Master's degree will be upon meeting all the academic requirements stipulated by NTU.

4+1 Bachelor-Master's Programme

This pathway is based on a 4 + 1 model, and tailored for the top cohort of the BA/BSc (Education) programme. An accreditation pathway to a Master's degree requires an extension of another year to the 4-year degree programme. Graduates of the 4 + 1 Bachelor-Master's Programme will be awarded the BA/ BSc (Education) and a Master's degree. MOE scholars may be granted provisional entry into the programme, and along with the rest of the degree cohort, their eligibility will be determined at the end of Year 2. A minimum of 4.0 CGPA (out of a 5.0 scale) will be required (Refer to Figure 16).

FIGURE 16: 4+1 BACHELOR-MASTER'S PROGRAMME
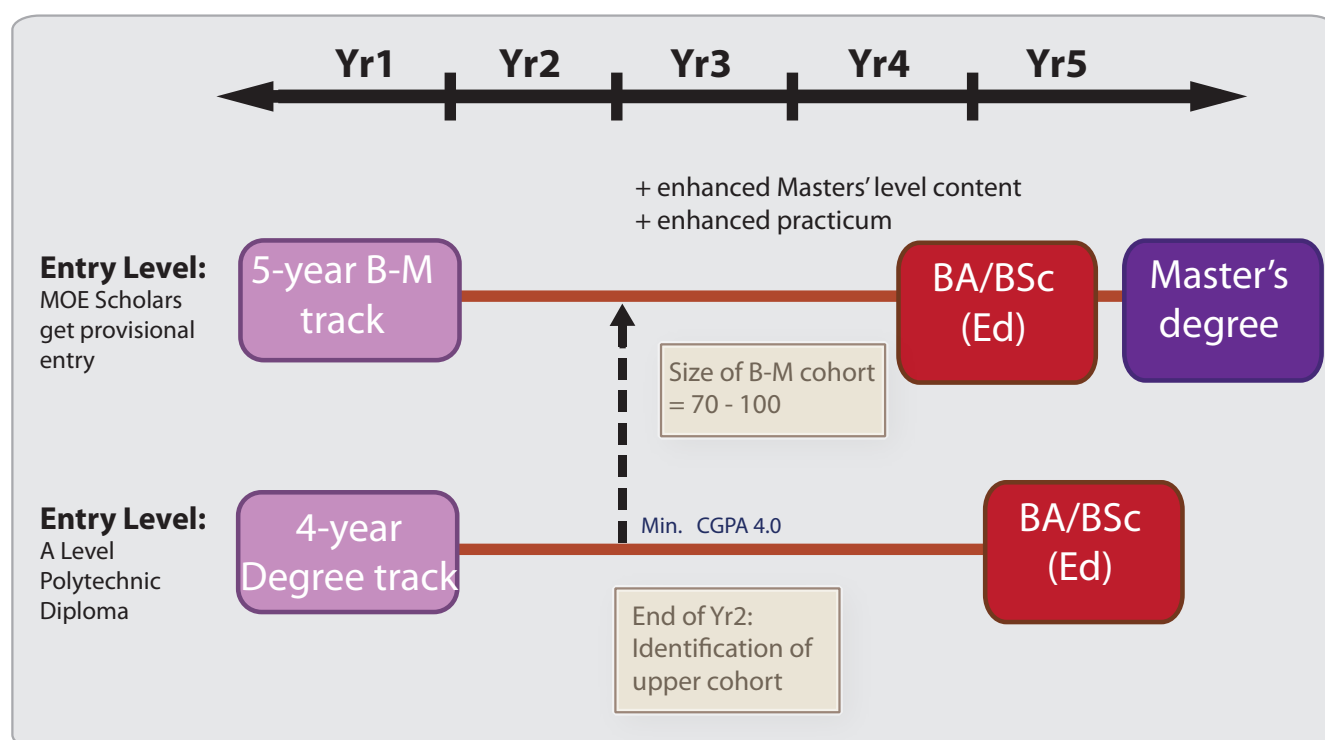
Student-teachers who qualify will be able to take advanced courses during their degree programme which will then be accredited to the Master's programme. The additional year will provide the necessary breadth and depth of content and pedagogical mastery and understanding, while the integration of content and pedagogy will strengthen the linkage with the schools' curriculum.

As an implementation strategy, NIE intends to adopt a staged approach. An initial estimate of the size of cohort for the 4 + 1 programme would be about 5-10% of the degree cohort, contingent on intake quality and MOE funding.

Transforming for the 21ˢᵗ century - 'Walking the Talk'

Transforming for the 21ˢᵗ century - 'Walking the Talk'

NIE's response to the changes in the education landscape and the various new demands of 21st century schools and students has been to undertake a strategic review and enhancement programme. The key recommendations which have been put forward by the review team are intended to enhance and strengthen our teacher education model. The success of this endeavour ultimately lies in effective implementation and sustainable impact. NIE as a community has to turn inwards and reflect on the necessary change of mindset, approach, systems, technology and capacity building that is required to turn best intentions into action, and pockets of excellence into a concerted synergy of institutional best practices. *'21ˢᵗ century teachers call for 21ˢᵗ century teacher educators'.* To truly walk the talk, a culture of inquiry and learning, continuous improvement, quality and excellence must be deeply embedded to drive change and achieve success in this transformation.

The four critical arenas where institutional change can make the most significant impact and elevate NIE towards an even higher level of distinction and excellence are:

(a) Evidence-informed improvements to teaching and learning

(b) Quality management system

(c) Faculty professional development

(d) Infrastructure and systems to support a learner-centred, learning culture

Evidence-informed improvements to teaching and learning

Improvements in NIE are the result of periodic reviews by the programme offices and through the efforts of NIE's research community. It is important that these changes and improvements are aligned with MOE's key education policies such as TLLM, National Education, C2015 and more recently PERI, to name just a few. These key educational policy developments must provide the strategic focus to our evaluations and research subjects, the outcomes of which must in turn drive programme innovations.

NIE's recent research data also points to the need for our TE programmes to undergo continual improvement and innovation in order to develop teachers who have the ability to promote 'complex learning' in students. Programmes will need to be designed such that they bear greater acuity to school and practitioner needs in terms of relevance and importance, and allow for closer

integration of academic knowledge and pedagogical skills. Academic staff should be encouraged and supported to form dynamic communities of practice to develop more meaningful reflective practice, critical inquiry, information literacy and professional engagement between other learning communities within and beyond NIE. Last but not least, academic staff also need to be mentally prepared for the intellectual and relational demands of teachers in issues of equity, inclusion, diversity and social justice[36].

Quality Management System

The rapidly changing global education landscape has led to increasingly higher expectations for quality teacher education programmes. Quality has to permeate throughout NIE, from programme development and management, to teaching approaches as well as the staff and graduands. Establishing a rigorous quality management (QM) system fosters a culture of self-evaluation, continual improvement, and institutional accountability which is the key to meeting the needs of NIE's stakeholders for greater accountability, and ensuring that our programmes are globally competitive. Figure 17 shows the framework for Academic Quality Management which will be used by NIE's new Office of Academic Quality Management which was established on 1 July 2009.

FIGURE 17: OAQMS FRAMEWORK FOR ACADEMIC QUALITY MANAGEMENT OF PROGRAMMES
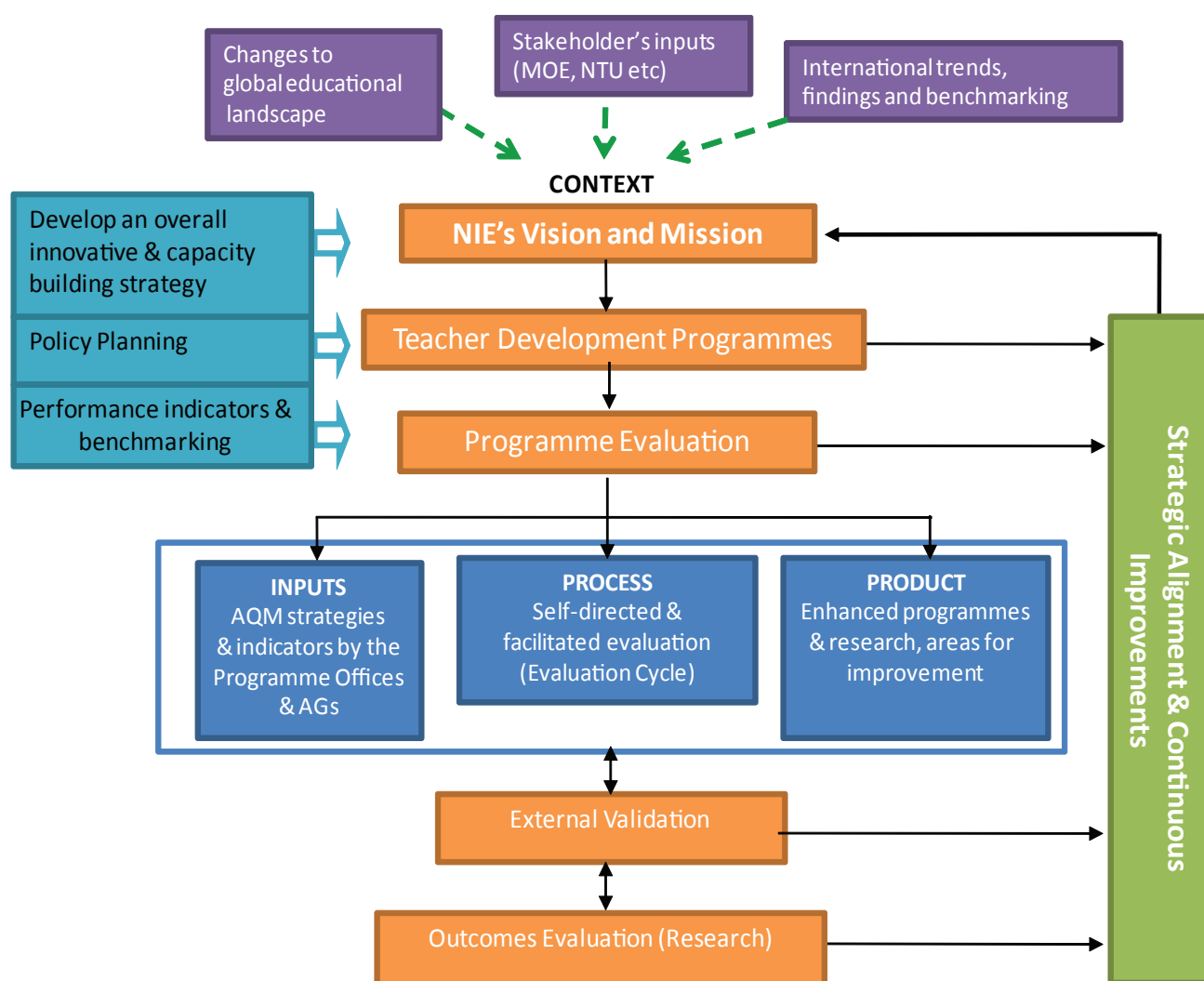
Faculty Professional Development

In the same way that capacity development of teachers is necessary to prepare them to meet the needs of 21st century schools, NIE faculty too require frequent injections of new learning, skills, and knowledge. A structured professional development programme would be a step in the right direction in ensuring that faculty are continually refreshed and updated in their teaching and research skills. A possible model for faculty professional development is the Harvard Medical School Teaching Academy, which focuses on upgrading the teaching skills of its faculty. The training and development programme addresses three levels of capacity building : basic, refresher, and advanced, each with specific objectives.

Another idea worth exploring is providing the necessary 'white space' in the form of mini-sabbaticals (lasting three months or so), which can be a means of giving academic staff opportunities to develop their skills and knowledge in research work or improving teaching skills. A strong mentoring culture is also seen as a key enabler in the faculty development process. An institute-wide Mentoring Framework would include both a structured mentoring programme targeted at selected high potential staff on the leadership pathway, as well as an organic system which encourages various forms of mentoring, from peer mentoring to capacity building activities such as workshops and seminars aimed at building a repertoire of skills which will help academic staff attain research and teaching excellence.

Finally, it is essential to establish a system which incentivises and rewards appointment holders for their sacrifice in forgoing opportunities which would take them further up the academic pinnacle in order to serve in a stewardship role fulfilling essential management, governance and leadership responsibilities.

Infrastructure and systems to support a learner-centred, learning culture

NIE's brand position as 'An institute of Distinction' necessitates an ability to articulate in a coherent, consistent and compelling manner, the good practices, processes and systems that have contributed to its success. In order to shepherd the recommendations that have been made by the review team to fruition and to yield long-term sustainable outcomes, it is imperative to ensure buy-in at all levels in NIE. The main elements that distinguish NIE's TE Model such as V³SK, GTCs, Theory-Practice Nexus, etc need to be accepted by faculty across-the-board and embedded into programmes, courses, curriculum

and teaching approaches, as an unequivocal validation that we truly 'walk the talk'. The same goes for key MOE policy initiatives such as C2015, MP3, and PERI, where NIE needs to ensure that it has a robust deployment mechanism which allows us to respond in a timely and appropriate manner.

While there are numerous examples of effective teaching practices and programmatic and pedagogical innovations, these exist within the confines of the AGs or in some cases, individual faculty. There is a need to scale up and systematise individual good practices into institutional best practices that NIE would be distinctly recognised for. It is likely that new platforms and coordinating mechanisms will need to be established to facilitate the processes of mapping good practices, cascading and sharing knowledge across NIE.

Sharing of new knowledge and information, of what works and what doesn't, of the latest technologies and pedagogies – this is the underlying value of a dynamic learning culture, where academic staff have the right information, at the right time to allow them to contextualise, adapt and improve their own teaching. Besides encouraging the right conditions for organic growth of communities of practice, specific learning platforms are needed to encourage sharing of good practices,

innovative ideas, and research findings, and thereafter to generate healthy discourse and where appropriate, reach consensus as a community for formal adoption of policy or practices. Examples of new learning platforms that may be considered are an annual corporate seminar, a "Research Day", or a regular series of "Sharing Days" or internal forums where every AG will have the opportunity to showcase their innovative practices and success stories.

There is a need to strengthen NIE's overall capacity to respond to a number of emergent needs by levelling up administrative support, either through specialised support or shared services. Some potential areas which merit further review include strategic staff support for the senior management team, particularly in managing and sustaining partnership interfaces with our key stakeholder, MOE; as well as in programme development, policy and planning. Another critical area is in integrating technology and infrastructure development to support and facilitate innovative teaching and learning. Additionally, innovative and up-to-date policies are also a key enabler of successful change management. The transformation process is likely to require a recalibration of human resource planning and policies to address and support the changing nature of roles and to drive capacity development efforts.

Next Steps . . .

Moving from review to implementation: driving the transformative process through continual programme development and innovation

NEXT STEPS…

Taking into account the vision of where we want our students to be and where we are now, the PRE recommendations signal a clear intention of what we at NIE need to do to establish our Teacher Education Model for the 21st century as the benchmark that others will seek to emulate.

The implementation of the PRE recommendations will crucially involve programme content refinements to ensure that the main areas of study within our programmes coherently develop and assess 21st century teacher competencies, from ITP through to TPD.

Starting with the V³SK, which represents the underpinning philosophy of teacher education at NIE, the reframing of the *Values* paradigm and the refreshing of the *Skills* and **Knowledge** components of the model serves to strengthen our approach to design, delivery and enhancement of programmes and courses which equip teachers with the necessary 21st century competencies to function effectively in the classroom throughout their careers, from ITP to TPD.

At the ITP phase, where focus is on "capacity-building" competencies, there is a need to :

- Articulate and implement a coherent way of developing and assessing the GTCs across the different areas of study (Education Studies, Curriculum Studies, Academic Subjects, Subject Knowledge, Group Endeavours in Service Learning and Practicum) as a student teacher progresses through the ITP journey

- Map and monitor at the individual course level, which of the competencies are being developed and assessed

- Refine content and assessment within courses where necessary so that GTC outcomes are clear

For competencies listed as "awareness-raising", there is a need at the TPD phase to

- Articulate and implement a coherent way of developing and assessing the GTCs across the different pathways of TPD (via in-service courses, advanced diplomas, postgraduate degrees)

- Map and monitor at the individual course level, which of the competencies are being developed and assessed

- Refine content and assessment within courses to ensure that GTC outcomes are clear

Drawing upon our research findings in the classroom over the last five years, we must pay attention to the shifting goals and re-focus of classroom instruction from knowledge transmission towards developing student capacities (knowledge, skills and dispositions) necessary

for complex knowledge construction, metacognitive self-regulation, effective cultural, civic and community participation, informed practical judgement and self development.

There is also a need to expand the range and improve the quality of instructional and assessment tasks, and to communicate relevant learning goals and the criteria and standards of successful performances of understanding to students. Strengthening instructional differentiation and pedagogical alignment, including critically, the articulation of assessment and instruction (i.e. formative assessment) and designing technologically rich and co-regulation learning environments therefore becomes essential. Finally, enhancing the instructional system in order to support significant and sustainable improvement in instructional practices becomes a crucial enabler to effecting the change process.

This continual programme development and enhancement process is a dynamic and iterative process as illustrated in Figure 18. Both external (global trends, MOE policy initiatives) and internal (NIE research findings) drivers inform programme design, refinement, innovation and finally, programme delivery. Common information sharing platforms involving research, programme offices and academic groups need to be either strengthened or new ones established. These might take the form of taskforces, workgroups, or communities of practice. The shared goal is to ensure that curriculum content is continually reviewed and enhanced, and that programmatic innovation in pedagogical and assessment modes is scaled up.

FIGURE 18 : NIE PROGRAMME REVIEW & DEVELOPMENT PROCESS

The draft report was endorsed by NIE Council on 2 September 09 and by Director-General of Education on 16 October 09.
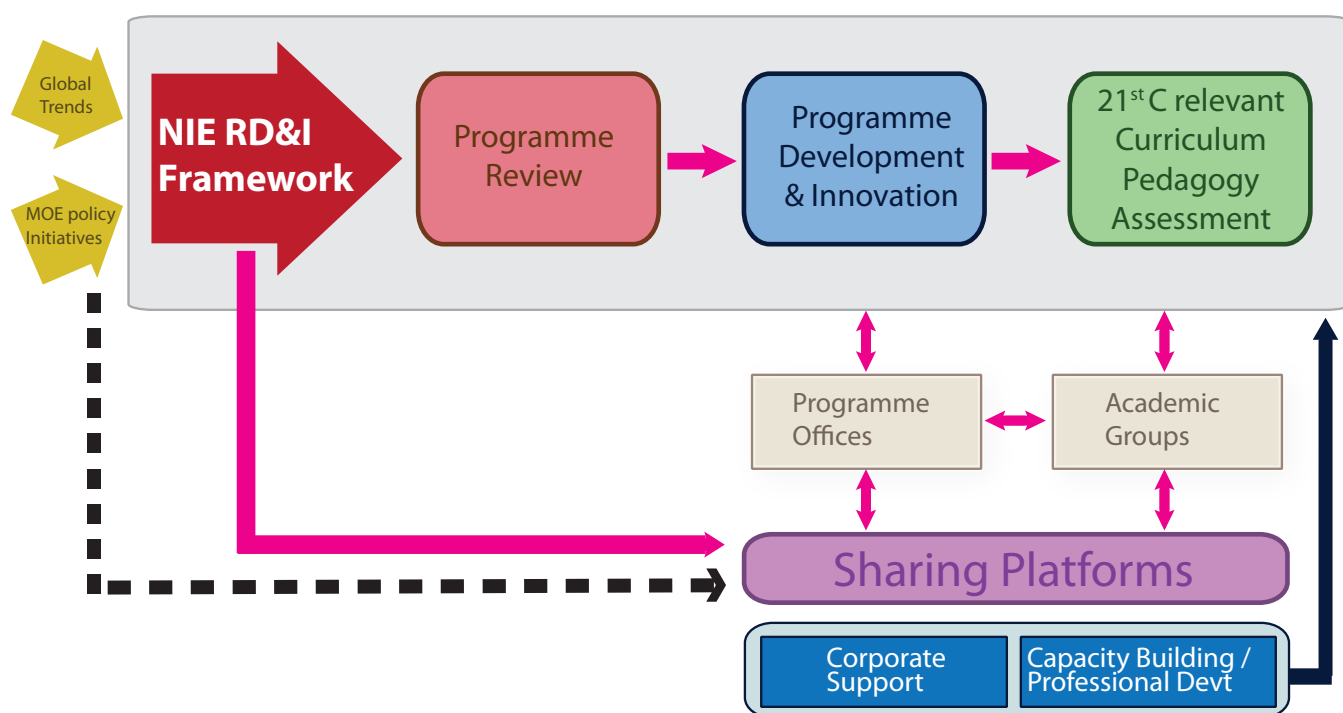
Endnotes

1 Qvortrup, L., 2008

2 Cochran-Smith and Zeichner, 2005; Darling-Hammond and Bransford, 2005

3 NIE, 2008

4 Ibid.

5 International Alliance, 2008

6 MOE, 2008

7 MOE, 2009

8 International Alliance 2008

9 MOE, 2008

10 Ho, P., 2009

11 Darling-Hammond, L. and Baratz-Snowden, J., 2005

12 Bransford, J. 2007

13 F. Korthagen, Loughran J., & Russell, T., 2006

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15 Cited in Dana, N.F., & Yendol-Hoppey, D. , 2009

16 Parsons R., & Brown, K., 2002

17 cited in Ibid.p.8

18 Ho, P., 2006

19 Korthagen, F. et al., 2006

20 Ibid, p.1029

21 Gayle, W. & Bodycott, P., 1992

22 Cited in Rone, T., 2008

23 Langer, G.M. et al, 2003

24 York-Barr, J., Sommers W., Ghere G.S., & Montie, J., 2001

25 Van Manen, J., 1977

26 Macbeath and Cheng, 2008

27 Kolb, 1984

28 MOE, 2009

29 Elwood, J. and Klenowski, V., 2002

30 MOE, 2009

31 Boud, 2007

32 Wray, S., 2008

33 Johnson, Mims-Cox, & Doyle-Nichols, 2006

34 Land & Zembal-Saul, 2003; Theel & Tallerico, 2004; Avraamidou & Zembal-Saul, 2003

35 Two earlier options were considered: i. a 5-year double degree with a pathway to master's,   and ii. 3+2 model starting with a school-relevant discipline studies programme leading to a BA/ BSc Hons with BTeach or a BA/ BSc with BTeach Hons.

36 International Alliance, 2008

37 Davie, S., 2009

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" Teaching is the profession on which all other professions depends. Indeed, everybody who is anybody was enabled to become somebody by a teacher. "[37]

- Prof Linda Darling - Hammond