Teacher Education in a Complex Environment: A Singapore Perspective

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National Institute of Education (NIE)

- An autonomous institute of Nanyang Technological University ( Ranked 41st by QS and 2nd in Top universities under 50 years old)
- NIE as an education college is ranked 13th in the world by QS in 2013 and ranked 1st in Asia.
Singapore

- A small country with limited resources
- **Human resource** is seen as the country’s most important asset
- **Education** seen as the key enabler to build the nation and equip its people with 21st CC
• Pragmatism over ideological, emphasising effort and standards of excellence.

• Singapore developed education policies which emphasise meritocracy, science, mathematics, English.
Overview (EGAO)

• Efficiency, Effectiveness, Expedience
• Growing Teacher Symbolism
• Authentic Learning: Professionalism and Continuous Learning
• Openness to change
Efficiency, Effectiveness, Expedience
Education is the most important investment in the long haul and the quality of education impacts on

- Nation Building
- People’s Capacity for Adaption
- Value Creation
- Values Preservation
- Capabilities for Innovation
Efficiency

- Outcome perspectives (e.g. desired outcomes of graduands)
- Long-term outlook
- Sustainability
Expedience

- Mindset Shift in dealing with education
- Smart Knowledge (understand globalisation, technology, nature of intelligence)
- Uncertainty and ambiguity
- Big picture and multi-disciplinary thinking
- Invariants of education
PAP (P’s and P’s) of Singapore’s System

- Paradigms (mindset), Philosophy (belief system), Practicality (action)
- Policies, Preparation, Practice
- Phase, Patience, Perseverance
21st Century Competencies

- Critical Thinking (Problem Solving)
- Collaborative (Teamwork)
- Creativity (Flexibility & Innovation)
- Communication (Interpersonal Skills)
- Connectivity (Project Management & Systems Thinking)
## Desired Outcomes

<table>
<thead>
<tr>
<th>At the end of primary education, students</th>
<th>At the end of secondary education, students</th>
<th>At the end of pre-university education, students</th>
</tr>
</thead>
<tbody>
<tr>
<td>are able to distinguish right from wrong</td>
<td>have moral integrity</td>
<td>are resilient and resolute</td>
</tr>
<tr>
<td>have learnt to share and put others first</td>
<td>have care and concern for others</td>
<td>have a sound sense of social responsibility</td>
</tr>
<tr>
<td>are able to build friendships with others</td>
<td>are able to work in teams and value every contribution</td>
<td>understand what it takes to inspire and motivate others</td>
</tr>
<tr>
<td>have a lively curiosity about things</td>
<td>are enterprising and innovative</td>
<td>have an entrepreneurial and creative spirit</td>
</tr>
<tr>
<td>are able to think for and express themselves</td>
<td>possess a broad-based foundation for further education</td>
<td>are able to think independently and creatively</td>
</tr>
<tr>
<td>take pride in their work</td>
<td>believe in their ability</td>
<td>strive for excellence</td>
</tr>
<tr>
<td>have cultivated healthy habits</td>
<td>have an appreciation of aesthetics</td>
<td>have a zest for life</td>
</tr>
<tr>
<td>love Singapore</td>
<td>know and believe in Singapore</td>
<td>understand what it takes to lead Singapore</td>
</tr>
</tbody>
</table>

Source: Ministry of Education
21st Century Competencies Framework

Source: Ministry of Education
Impact on Educational Policy

• A Good System Built on Sound Fundamentals

• Holistic Education
  – Bilingual advantage
  – Broad-based and Holistic Learning
  – Good teachers and school leaders
  – ICT-infused curriculum
  – Partnership with Parents
Impact on Educational Policy

• **Student-Centric, Values-driven**
  – Applied Learning Programme
  – Learning for Life Programme

• **A Holistic Approach to Teacher Education**
  – Values-based Education
  – Tripartite Partnership
Tripartite Partnership

MOE

Schools

NIE (University)
Singapore’s performance as a system

- Ranked among the top in Reading, Mathematics and Science (PISA 2009)
- Ranked among the top in Mathematics and Science (TIMSS 2011)
- Ranked among the top in Literacy (PIRLS 2011)
- Ranked among the top in the 2013 and 2014 International Physics, Mathematics, Chemistry, Biology and Informatics Olympiads
Strong emphasis on Mathematics and Science

To equip students with the basic knowledge and analytical skills to move Singapore up the value-chain, and retain our competitive advantage in a globalised knowledge-based economy.
**Key Finding 1:** Strong performance in applying knowledge and skills in unfamiliar real-life situations

<table>
<thead>
<tr>
<th>Mathematics literacy skills</th>
<th>Reading literacy skills</th>
<th>Science literacy skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shanghai 613</td>
<td>Shanghai 570</td>
<td>Shanghai 580</td>
</tr>
<tr>
<td><strong>Singapore 573</strong></td>
<td>Hong Kong 545</td>
<td>Hong Kong 555</td>
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<tr>
<td>Hong Kong 561</td>
<td><strong>Singapore 542</strong></td>
<td><strong>Singapore 551</strong></td>
</tr>
<tr>
<td>Chinese Taipei 560</td>
<td>Japan 538</td>
<td>Japan 547</td>
</tr>
<tr>
<td>Korea 554</td>
<td>Korea 536</td>
<td>Finland 545</td>
</tr>
<tr>
<td>Macao 538</td>
<td>Finland 524</td>
<td>Estonia 541</td>
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<tr>
<td>Japan 536</td>
<td>Ireland 523</td>
<td>Korea 538</td>
</tr>
<tr>
<td>Liechtenstein 535</td>
<td>Chinese Taipei 523</td>
<td>Vietnam 528</td>
</tr>
<tr>
<td>Switzerland 531</td>
<td>Canada 523</td>
<td>Poland 526</td>
</tr>
<tr>
<td>Netherlands 523</td>
<td>Poland 518</td>
<td>Canada 525</td>
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<tr>
<td>Estonia 521</td>
<td>Estonia 516</td>
<td>Liechtenstein 525</td>
</tr>
<tr>
<td>Finland 519</td>
<td>Liechtenstein 516</td>
<td>Germany 524</td>
</tr>
<tr>
<td>Canada 518</td>
<td>New Zealand 512</td>
<td>Chinese Taipei 523</td>
</tr>
<tr>
<td>OECD Average 494</td>
<td>OECD Average 496</td>
<td>OECD Average 501</td>
</tr>
</tbody>
</table>
Our strong performance shows our students:

- possess strong fundamentals
- are adept at applying knowledge and skills in solving novel real-life problems
- can navigate in computer-based environments, work with less structured data, interact and uncover relationships

Students have the **strong fundamentals to meet the challenges of employment and life-long learning in the 21st century**
Bacteria that live in our mouths cause dental caries (tooth decay). Caries has been a problem since the 1700s when sugar became available from the expanding sugar cane industry.

Today, we know a lot about caries. For example:

- Bacteria that cause caries feed on sugar.
- The sugar is transformed to acid.
- Acid damages the surface of teeth.
- Brushing teeth helps to prevent caries.

Question 1: TOOTH DECAY

What is the role of bacteria in dental caries?

A  Bacteria produce enamel.
B  Bacteria produce sugar.
C  Bacteria produce minerals.
D  Bacteria produce acid.

Question 4: TOOTH DECAY

The following graph shows the consumption of sugar and the amount of caries in different countries. Each country is represented by a dot in the graph.

Which one of the following statements is supported by the data given in the graph?

A  In some countries, people brush their teeth more frequently than in other countries.
B  The more sugar people eat, the more likely they are to get caries.
C  In recent years, the rate of caries has increased in many countries.
D  In recent years, the consumption of sugar has increased in many countries.
Key Finding 2: Improved performance of our academically-weaker students

- Proportions of **low performers** have dropped to **below 10%**
Singapore’s secondary system provides different tracks and subjects to meet a range of abilities and needs. Some 30% of less academically inclined students take vocational and technical subjects, and schools build close links to institutes of technical education and polytechnics.
The Singapore education system aims to help our students discover their talents, realise their potential, and develop a passion for learning that lasts through life.

This infographic provides an overview of the Singapore education landscape.
Key Finding 3: Students achieve their fullest potential and scale peaks of excellence

- Efforts to level up academically-weaker students are not at expense of stronger students

![Bar charts showing improvements in top performers across Mathematics, Reading, and Science.](chart.png)
“Strong Fundamentals, Future Learnings”
Education is not just about preparing people for the future; it is also about creating our future.
Learning for Life

• Every secondary school to develop Applied Learning Programme for real-world applications of knowledge and skills, and Learning for Life Programme to develop character and values through real-life experiences

• More opportunities for Continuous Education and Training for Singaporeans of all ages
Student-Centric & Values Driven Holistic Education

Instilling Deep Values
Values in Action/Character and Citizenship Education to cultivate values and commitment to Singapore and fellow Singaporeans

Building Deep Foundation for Learning
Comprehensive suite of levelling-up programmes to ensure that all students who require additional help will receive it.
Providing Broad, Inclusive and Holistic Education

• Every primary school to have Programme for Active Learning and emphasise more on PE, Art and Music to allow students to discover interests, strengths and develop holistically

• Broadening PLSE Scoring to reduce overemphasis on examinations
Growing Teacher Symbolism
Pioneer educators lauded for shaping entire generation

Education minister Heng Swee Keat (centre) greets 100-year-old Mrs Mangalesvary Ambiavagar (left), former principal of Raffles Girls' Primary, Bedok Girls' and Balestier Boys' School, during the Ministry of Education dinner to honour pioneer educators on 31 July, 2014. -- ST PHOTO: MARK CHEONG
Values, Skills and Knowledge

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

**V1 - 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 responsibility and engagement
- Stewardship

**Skills**
- Reflective skills & thinking dispositions
- Pedagogical skills
- People management skills
- Self-management skills
- Administrative & management 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

Source: NIE V3SK Model
TALIS 2013 – Key Findings (Singapore)

- Strong teacher preparation enables quality teaching and learning
- Active participation in, and strong support for, professional growth throughout career
- A teacher workforce that is well-trained and dynamic
- Teachers are valued, are satisfied with their job and would still choose to be a teacher if they were to decide again
Leadership Track

Specialist Track

Teaching Track

Leadership Track
For a career in school administration

Specialist Track
For a career in curriculum and instructional design, educational psychology and guidance, educational testing and measurement, or educational research and statistics

Teaching Track
For a career focused on excellence in teaching

All Classroom Teachers
Support for Teachers

TEACH Framework

- Engagement:
  - Dedicated HR Partners for School Leaders
  - Multiple Engagement Points for Teachers

- Aspirations:
  - Better Support for Part-Time Masters
  - Additional Advanced Diploma Offerings
  - New Study Awards (Postgraduate and Undergraduate)

- Career:
  - Wider Choice of Key Personnel Positions in Schools
  - More Expertise-Building HQ Positions

- Harmony:
  - Part-Time Teaching Scheme Expansion
  - Enhanced No-Pay Leave Scheme
  - Work Management Guidelines

Source: Ministry of Education
Support for Teachers

• Professional Development
  – Scholarships
  – Study loans
  – Leave provisions for further studies
• Teachers’ Work Attachment
• Training courses and conferences
• Academy of Singapore Teachers
Human Resource Development Support

• Academy of Singapore Teachers
• ICT-Infused Curriculum
• Academic and Vocational Development
  – Institute of Technical Education
  – Polytechnics
Rising above structures, human as resources, standards and competition

- Requirement, recruitment, ITP → Teacher symbol
- Teacher’s workload → Teacher calling and competencies
- Teacher’s roles → Teacher professional development
- Compensation, Salary, Benefits → Professional care, Proactive clinical practices
- Results, accountability → Teacher leadership and inspiration
- School management and appraisal
NTU, NIE to groom teaching scholars

New degree programme for 34 aspiring teachers

By AMELIA TENG

MASTERING THE ART

“It’s important to learn how to teach and not just focus on content. That’s why I chose to spend a longer time in a teaching programme.”

— Ms Lin Siyue, who received a teaching scholarship

PASSION FOR SUBJECT

“There’s a satisfaction in devoting yourself to teach what you love to others.”

— Mr Shawn Tan, who has loved music since childhood

from the Ministry of Education (MOE) yesterday.

MOE scholars and teaching award holders in the NIE’s four-year bachelor’s programmes are automatically placed on the TSP.

Miss Lin was one of 204 aspiring teachers who received the awards at the Grand Copthorne Waterfront Hotel yesterday.

Addressing them, Education Minister Heng Swee Keat said it will be important for teachers in the next few decades to “help their students develop their values and strength of character that will form their personal anchors in a world of flux”.

The scholarships and awards fund students for their local or overseas undergraduate studies, after which they have to serve a four- to six-year bond.

Scholarship recipient Shawn Tan, 21, will follow up his childhood love for music by studying it at King’s College London.

After taking piano lessons in Primary 3, he joined the school band and then mastered the trombone. Later, he joined the National Junior College’s piano ensemble and studied music at O and A levels.

“There’s a satisfaction in devoting yourself to teach what you love to others,” said the former Whitley Secondary School student.

“I wanted to pursue a career in music, but for some time I was unsure of what I really wanted to do. It was my music teacher in junior college, Mr Seow Aik Keong, who helped me to think through...
Asia’s education secrets revealed

The secret of understanding

The Teacher Factor

Teacher preparation is the sowing of seeds for lifelong learning

The training of teachers does not end when they enter the classroom.

Asia’s successful education systems are underpinned by

ensuring teachers are well equipped with subject matter expertise and how best to teach a subject. More time is spent on practical teacher skills such as understanding student psychology, and applying these insights to the classroom.

The training of teachers does not end when they enter the classroom. Professional development, sponsored by the Ministry of Education and supported by school leaders, is essential to ensure they adapt to the changing profile of new generations of students.

For example, Asian teachers are innovatively using pedagogies that tap on the cyber space environment and take their learners into the 21st century. Professional development also ensures they are being mentored and progressing satisfactorily in their careers. By ensuring the professional welfare of the operators of the education engine, the system works towards a win-win situation for every stakeholder – in contrast to many Western counterparts who are often caught up with union issues.

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Authentic Learning
EPMS is a holistic teacher evaluation tool

- Self-evaluation
- Coaching and mentoring
- Leadership Development
- Career Development
- Performance-Linked Recognition

EPMS
Professional Learning Communities
Openness to Change and Ambiguity
Teaching is about **transforming lives and creating the future.**
Creators of knowledge, NOT merely consumers

Facilitators of learning, NOT merely transmitters

Architects of learning environment, NOT merely implementers

Leaders of educational change, NOT merely followers
Not creating value in education if we...

- Teach content and routines that becomes obsolete
- Impart skills that are not sufficiently transferable across situations
- Use learning processes that do not impact on life-wide learning
- Use learning environments that do not encourage motivation and independence
Challenge of Mindset Shifts in Education

Hardware
Structures
Industrial Models

Intelligence
• Developing human intelligence is about learning to solve problems.
• Problem solving in real-world contexts involves multiple ways of knowing and learning
• Harnessing intelligences
  – from within individuals,
  – from groups of people and
  – from the environment to solve problems
Novelty

Inquiry

Problem-based

Big Picture Matrix

(Multiple & Integrative)

Ambiguity

Patterning System

Habits

Memory

iMitation

Modeling

Asian brain

American brain

National Science Foundation

Distinguished Lecture at Washington D.C.
More I’s

- Imagination
- Immersion
- Inquiry
- Insights from observation
- Inventiveness
21st century Learners call for 21st century Teachers

STUDENT - 21st century

MOE and School Initiatives

Research: NIE and International

Best practices in TE

21st century Teachers call for 21st century Teacher Educators
Content and Real Contexts

• Strengthen Contextualize
• Require Contextualize
• Contextualize – **REAL** world relevance
• Contextualize – relevant applications
• Contextualize – good connectivity
Secrets of …

• Multiple **disciplinarity exposure**
• Multiple **perspectives taking**
• Multiple **ways of knowing**
We must learn to see the world anew ...

- Albert Einstein
Changing Roles of the Teacher

**Good Didactics**

Student  ⇔  Lecturer  (Source of knowledge)

**Engagement**

Facilitator  ⇔  Process, Heuristics

**Technology**

Mediator  ⇔  Designer  Knowledge Management & Environment
Leveraging Points in Education

• Discovery of Habits
• Discovery of Novelty
• Discovery of Invariants
• New Power of Habits and Novelty
Changes in Pedagogies and Assessment

- Self-Directed and Real-World Learning
- Power of Technology
- Assessment for and as learning
- Theory-Practice Linkages
- Purposeful Reflection
- Teaching and Learning e-Portfolio
- Enhanced Practicum Model and Mentorship
- Transformation of Physical Infrastructure
“There is nothing that is a more certain sign of insanity than to do the same thing over and over and expect the results to be different.”

Albert Einstein
I have a dream …

I have a dream
A song to sing
To help us cope with anything
If you see the wonder of a
Teacher’s role
You can take the future
What’er the learning curve
We believe in Teachers
Something good in everything we see
We believe in Teachers
And we’ll bring humanity with us
We’ll cross the stream – we have a dream

I have a dream
A hope to see
To help us through reality
And our destination make it worth the while
Children of our future
Youth that rise to serve
We believe in Teachers
Something good in everything we see
We believe in Teachers
And we’ll bring humanity with us
We’ll cross the stream – we have a dream
Lead. Care. Inspire.
THANK YOU!