HARNESSING ICT, TRANSFORMING LEARNERS

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Outline

• mp Journey – Central philosophy & Context
• Key components of mp3
• Scaling & Diffusion of Practice
• Concluding Remarks – What’s next?
ICT Masterplans for Education (mp)

• Why?
  • Part of overall IT plans for Singapore
  • Strengthen human and physical infrastructure

• Key principles
  • Pedagogy-led developments
  • Whole-of-system transformation (Policy makers, school leaders, teachers & researchers)
  • **Alignment** of economics, manpower & education policies
mp Journey

1997: Building the Foundation

2003: Seeding Innovation

2009: Strengthening & Scaling
mp3 Vision

Harnessing ICT, Transforming Learners

**Enabler Goals**

**School Leaders** provide direction & create conditions to harness ICT for learning and teaching

**Teachers** have capacity to plan & deliver ICT-enriched learning experiences

**ICT infrastructure** supports learning anytime, anywhere

**Outcome Goals**

**Students** develop competencies for self-directed & collaborative learning through the effective use of ICT as well as become discerning & responsible ICT users
mp3 Guidance

• Framed within Curriculum 2015 (Strong Fundamentals, Future Learnings)

• Holistic – balance between academic & soft skills

• Incorporation of 21st Century Competencies

• Deepen ground expertise to allow for greater contextualisation

• Tracking of progress
What is considered meaningful use of ICT?
- What one really wants to do but cannot do without ICT
- More mundane but important, e.g., Efficiency gains
From Ideas to Practice

Ideas Generation
- From teachers, researchers, HQ & industry

Proof-of-Concept

Translation Research
- Lesson packages
- Design principles
- Pedagogical principles
- Implementation strategies
- ICT tools / applications

Ready for Scaling
- YES
- NO

Scaling to Practice

Review Efficacy
From Ideas to Practice

IHL Research
eduLab
FutureSchools
Propel-T
Spreading of Innovations

- Ideas Generation
- Proof-of-Concept
- Translation Research
- Ready for Scaling
- Scaling to Practice
- Review Efficacy
Framework for Scaling

**Organic Diffusion**
- FutureSchools
- Vibrant and pervasive ICT culture

**Top-Down Diffusion**
- COEs (ICT) / Niche (ICT) / eduLab schools
- Use of ICT for at least one subject across one educational level

All Schools

- R&D Collaborations
- eduLab Projects
- FS initiated platforms
- Sharing Lesson packages*

- Embedding into the curriculum (CPDD)
- Facilitating procurement (IDA/ITB)

- ICT Connection
- eduLab@MOE
- ICT Mentor
- AST Networks
- CoPs
- iCTLT

- Sharing Lesson packages*
Support Structure for Scaling

- **ICT Connection**
  - EduMall
  - Curriculum, Pedagogy & Assessment
  - ICT in Syllabus
  - Cyberwellness

- **Learning Communities**

- **ICT Mentor Programme**
  - Professional Development

- **Consultancy & Partnership**

- **Teachers**

- **Infrastructure Support**
  - ICT Grant
  - Internet Access & Hardware

- **Leadership**

- **School Leaders Programme**

- **ICT PD Framework**
What does a typical school look like?

- Strong leadership for ICT implementation in curriculum
- Systematic, customised and differentiated PD structures & processes
- Pervasive use of ICT for SDL & CoL
- Teacher collaboration on ICT platforms
- Emerging Practices in Classroom:
  - Digital textbook for Science (not just digitised textbook)
  - Digital learning trail (eg. augmented reality)
  - Game-based learning
  - Digital storytelling
  - Automated marking for English
Concluding Remarks – What’s Next?

• Transforming culture & classroom practices crucial
  • Teacher capacity (100hrs paid PD/yr, structured mentoring, white spaces)
  • School leaders
  • Pedagogy-led transformation (including infrastructure, resources)

• Consolidate & Deepen

• Curriculum-ICT Nexus

• Assessment of 21\textsuperscript{st} Century Skills
  • Not new, but attempt to automate is
  • Tasks – Digital Literacies & Collaborative Problem-Solving
  • Incorporate into pedagogical practices (eg. \textit{Productive Failure})
  • Measurement of learning outcomes
Concluding Remarks

- Teachers:
  - From teaching to designer of learning
  - From info-gatherer to co-generator of knowledge
  - 2 types of knowledge: deep (own) plus knowing where to look
  - Reflective Practitioner (cliché, but crucial)

- Policy response?
  - Balance between formal & informal learning
  - New model/structure for learning?
  - Curriculum: 3 layers – core, career-shaping, career-retooling
  - Reform of assessment practices
Parallel development in Education, Manpower & Economic Policies

- Labour-intensive industries
- Capital & Tech industries
- Tech industrial base widened
- National Computerisation Plan
- National IT Plan
- Gifted program
- Induction of streaming
- Lifelong learning, creativity & broad-based education
- Position for foreign investments in high value-added industries
- Promotion of IT, financial, educational lifestyle & medical sectors
- National CET System
- A* Star
- Position as Education Hub
- Life Sciences, Biotech & Nanotech
- ERC recommendations
- IDM
- NRF
- National CET System
- Values-Drive, Student-Centric Education
- Innovation & enterprise, compulsory education, IT Masterplan 2
- TLLM
- Academy of Singapore Teachers
### Curriculum 2015 Student Outcomes

<table>
<thead>
<tr>
<th>Confident Person</th>
<th>Self-directed Learner</th>
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<tr>
<td>Thinks independently</td>
<td>Takes responsibility for own learning</td>
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<tr>
<td>Communicates effectively</td>
<td>Questions, reflects, perseveres</td>
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<tr>
<td>Has good inter-personal skills</td>
<td>Uses technology adeptly</td>
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<tr>
<td>Concerned Citizen</td>
<td>Active Contributor</td>
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<tr>
<td>Is informed about world and local affairs</td>
<td>Exercises initiative and takes risks</td>
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<tr>
<td>Empathises with and respects others</td>
<td>Is adaptable, innovative, resilient</td>
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<tr>
<td>Participates actively</td>
<td>Aims for high standards</td>
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### mp3 Goal
Students develop competencies for self-directed and collaborative learning through the effective use of ICT as well as become discerning and responsible ICT users.
Singapore’s 21st Century Skills Framework
IHL Research

- Game Based Learning
- Knowledge Building
- Productive Failure
- Digital Story-Telling
- Mobile Learning
- Generative Activities
- Augmented Realities
- i-Cube
- Learning Analytics
Game Based Learning

- A social studies learning programme centered on an online multi-player game.
- Students take on the role of governors in the fantasy kingdom Velar, to learn & apply principles of governance.
EduLab

- Network of conduits for ground-led projects aimed at extending context of tested ideas which have the potential for scaling.

- Some characteristics:
  - 2-yrs, small scale trials
  - Up to 5 schools per idea
  - Collaboration with IHLs & Industries where applicable

- Outcomes:
  - Pedagogical principles for scaling
  - Lesson packages
  - Applications & tools where possible
EduLab

- So Far: eduLab@NIE and eduLab@AST

- Foster Ideation/collaboration
- Encourage adoption of education technology
- Provide infrastructure for experimentation
Future Schools

Beacon Primary School
Diverse digital learning spaces, 3D learning environment, holistic development

Canberra Primary School
Play as pedagogy and integrated curriculum

Jurong Secondary School
e-Problem-based learning, media literacy, assessment of 21st Century skills

Hwa Chong Institution
Independent & diverse learning in a borderless world

Crescent Girls’ School
Student-centric learning, teaching & assessment, integrated curriculum

School of Science & Technology
Leverage 1-to-1 networked computing to support 21st century learning & foster critical thinking, collaboration and communication

Ngee Ann Secondary School
Propel-T

- Small, HQ-led experimentation based on emerging & anticipated trends.

- **1:1 computing**: harnesses principles of social-constructivist learning to co-design lessons with teachers for enactment in different 1:1 computing contexts.

- **AfL**: harnesses AfL principles to guide the use of automated marking tools (i.e. Criterion) in grammar instruction.

- **CSCL**: use of Wiki and Knowledge Forum (KF) to augment the instructional practices based on the principle of “idea-centered classroom – working with students’ ideas”.

ICT Mentor Programme

4 Mentors: 1 School

ICT Mentor Basic Course

- Design ICT facilitated SDL & CoL Lesson
- Coaching

ICT Mentor Subject Based Communities

- Deepen ICT-pedagogy in subject disciplines
School Leaders’ Programme

- Lectures by thought leaders
- Learning Journeys
- Online Courses and discussion
- SLs as facilitators and collaborators
- SLs sharing reflection online and participating in social media
ICT Connection

- Channel to communicate mp3 goals and information
- Facilitate dialogue on mp3’s strategic intent
- Illustrate meaningful use of ICT in education

Trace the journey undertaken by Singapore to harness ICT for the engaged learning of all students and to equip them with ICT skills.

Understand Masterplan 3 in terms of its vision, goals and strategies to enrich and transform the learning environments of our students, and to equip them with skills to succeed in a knowledge economy.

Learning Teams seed and sustain dialogue with teachers and practitioners to clarify strategic intent of mp3 within a teacher-driven culture towards professional excellence.

See ICT in Action in the classroom, where pedagogy and technology are integrated to bring about meaningful use of ICT in learning and teaching.
Selected Major Findings

• **Productive Failure** is better than traditional **Direct Instruction** on **conceptual understanding and transfer** without compromising **procedural fluency**

• Students that seem **strikingly dissimilar** on **academic competence** (PSLE) appear **strikingly similar** in terms of their **design competence**

• **Design competence** correlated with learning gains, but teachers/experts are generally good estimators of **academic competence** but not of **design competence**
Thank You!