

Singapore's ICT in Education Masterplans and Corresponding Pre-service Teacher Preparation through Technological, Pedagogical and Content Knowledge(TPACK)

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Background

- Singapore is a multiracial country, citizen=3.34 million. Teaching force is round 33000, about three hundred primary and secondary schools, teacher-to-pupil ratio 18 in primary schools, and 14 in for secondary schools (2012)
- Teachers are recruited after they have completed their high school/diploma or degree courses. Applicants apply through MOE, are interviewed and reviewed then enter teacher college for a minimum of 9 months Post Graduate Diploma in Education or two years of Diploma in Education (non-graduate) or 4 years degree course. There is one “ICT for Meaningful Learning” (24 hours) compulsory course.

Graduate Core Competencies

Three dimensions 7 aspects, 1 teacher ed Professional Practice

1. Nurturing the whole child
2. Providing quality learning of child
3. Providing quality learning of child in CCA
4. Cultivating Knowledge: subject mastery with reflective, analytic and creative thinking

Graduate Core Competencies

Leadership & Management

5. Winning Hearts and Minds: Understanding the Environment and Developing Others
6. Working with Others: Partnering Parents and 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

A case: ICT for Meaningful Learning

- The 3rd Singapore ICT Masterplan focuses on self-directed and collaborative learning with ICT.
- NIE adopted the Technological Pedagogical and Content Knowledge (TPACK) framework to build and research preservice and inservice teachers' TPACK through design-based learning.
- This case describes the approach and report the preservice teachers' perception and performance.

TPACK – Teachers' knowledge for ICT lesson design

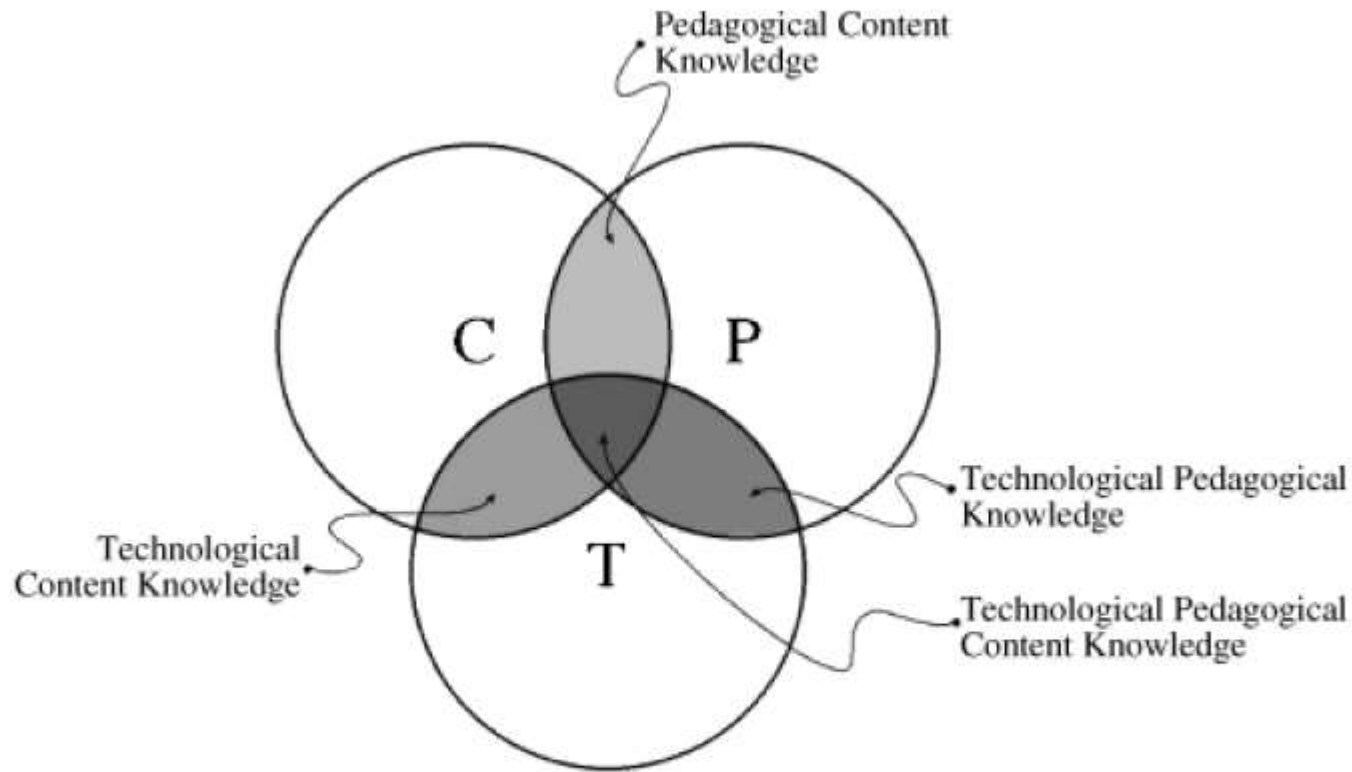


Figure 4. Pedagogical Technological Content Knowledge. The Three Circles, Content, Pedagogy, and Technology, Overlap to Lead to Four More Kinds of Interrelated Knowledge.

Dimensions of Meaningful Learning

- Authentic (complex / contextual)
- Constructive (articulative / reflective)
- Active (manipulative / observant)
- Intentional (reflective / regulatory)
- Cooperative (collaborative/ conversational)

Howland, J. L., Jonassen, D., & Marra, R. M. (2012). *Meaningful learning with technology* (4th ed.). Boston, MA: Allyn & Bacon.

Session	PEDAGOGICAL APPROACHES
1	Introduction: Overview of ICT in the Singapore education system (Social Walls) TK, CONTEXT
2-3	Dimensions of Meaningful Learning I <i>Reciprocal Teaching (RT)</i> (Google Presentation) PK, TPK
4	Lesson Planning (Ideation- Part of Design based learning) <u>Critique of Lesson Plan</u> (Google Doc) PK, PCK, TPK
5-7	TEL 1 Cyber Wellness TPK, collaborative design 1
8-10	TEL 2 Curriculum subject (CS), Selected TEL tools, TCK, TPACK, collaborative design 2
11	Individual Assignment Consultation and Preparation, TPACK, individual design
12*	Course Closure, reflection

Paired sample t-test *TPACK* survey ($N=155$)

Factors	Alpha Reliability	Pre-test	Post-test	t	Cohen d
TKW	0.93	M=5.86, SD=1.03	M=6.24, SD=0.78	4.50***	0.42
TPK	0.93	M=4.79, SD=0.94	M=5.71, SD=0.71	10.75**	1.10
TCK	0.83	M=3.94, SD=1.34	M=5.33, SD=0.95	12.34***	1.20
TPACK	0.96	M=5.07, SD=1.09	M=5.80, SD=0.79	16.61***	0.77
DT	0.93	M=5.21, SD=0.83	M=5.58, SD= 0.79	8.89***	0.46

* $p < .05$, ** $p < 0.01$

Other Information: Sustaining ICT

- Monitoring teachers' progress and sustainable innovative practices:
 - Professional development Continuum Model
 - [Enhanced Performance](#) management system
 - Evidence based rewards
 - School-based Professional Learning Communities

Lesson learned

- Overall, the three ICT masterplans, and the just launched [fourth ICT masterplan](#) is one way to sustain innovation (Policy): It takes times!
- First masterplan, first order barriers (Ertmer, 1999), basic infrastructure, basic ICT skills teachers and students
- Second masterplan, second order barrier (Ertmer, 2005, Lim & Chai, 2008), teachers' beliefs
- Third masterplan, third order barrier (Tsai & Chai, 2012), teachers' design capacity, TPACK (Chai, Koh, Tsai, 2013)

Lessons learned

- TPACK framework worth pursuing for innovation in ICT but longer term teacher professional development needed (Theory)
- Focusing on leadership, teacher PD, students outcomes, and infrastructure
- Teacher learning communities (Practice)