

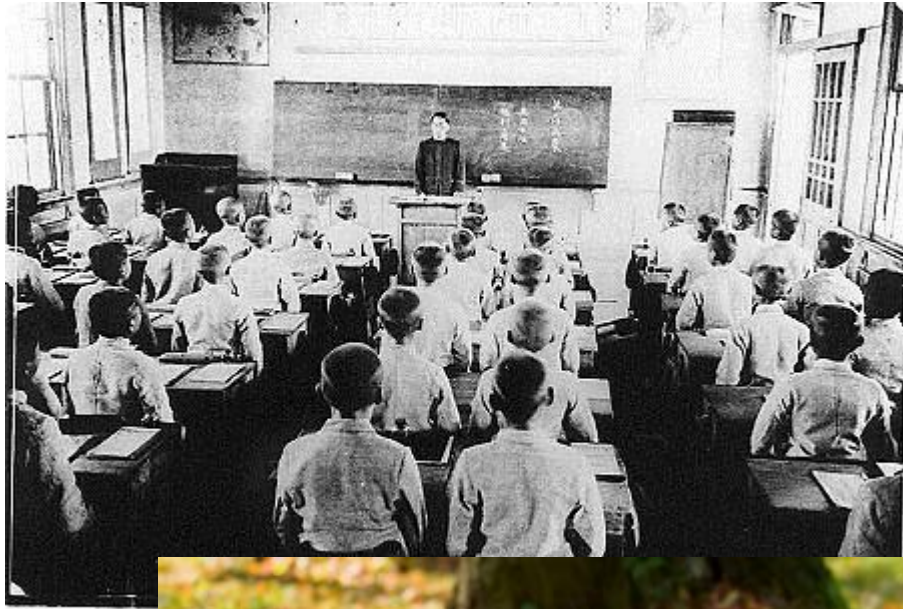
Personalized Learning in the Age of Mobile Connectivity



Wong Lung Hsiang, PhD
Learning Sciences Lab
National Institute of Education
Nanyang Technological University
Singapore



But ... where shall *learning* take place?



The conference planning committee hard at work!

We are entering the age of **mobile connectivity** ...

- According to Horizon Reports (2004-2011) ...

<http://www.nmc.org/>

The most mentioned up-and-coming learning technologies are ...

1. Mobile learning ('06, '07, '08, '09, '10, '11)
2. Augmented reality ('05, '06, '10, '11)

Game-based learning ('05, '06, '07, '11)

Knowledge webs / new scholarship & emerging forms of publication / collective intelligence ('04, '05, '07, '08)

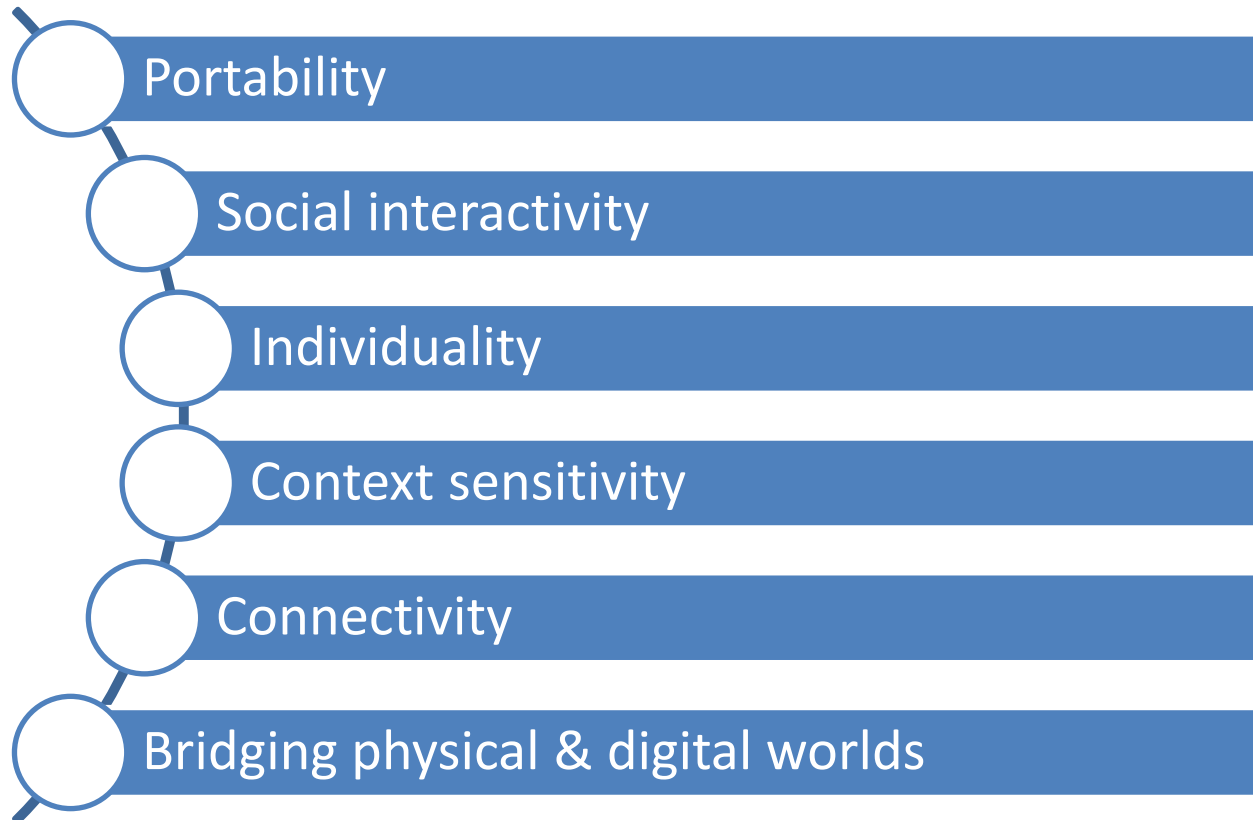
The prevailing trend ...

personalized learning!

- Most of the prevailing learning technologies are meant for empowering learners ...
 - to challenge transmissionist/behaviorist learning
- Let learners self-select (analogy of fishing) ...
 - Learning goals
 - Learning paths
 - Learning methods, strategies
 - Learning resources (**content/knowledge vs. resources**)
- Authentic learning, e.g., Augmented Reality

But why mobile learning?

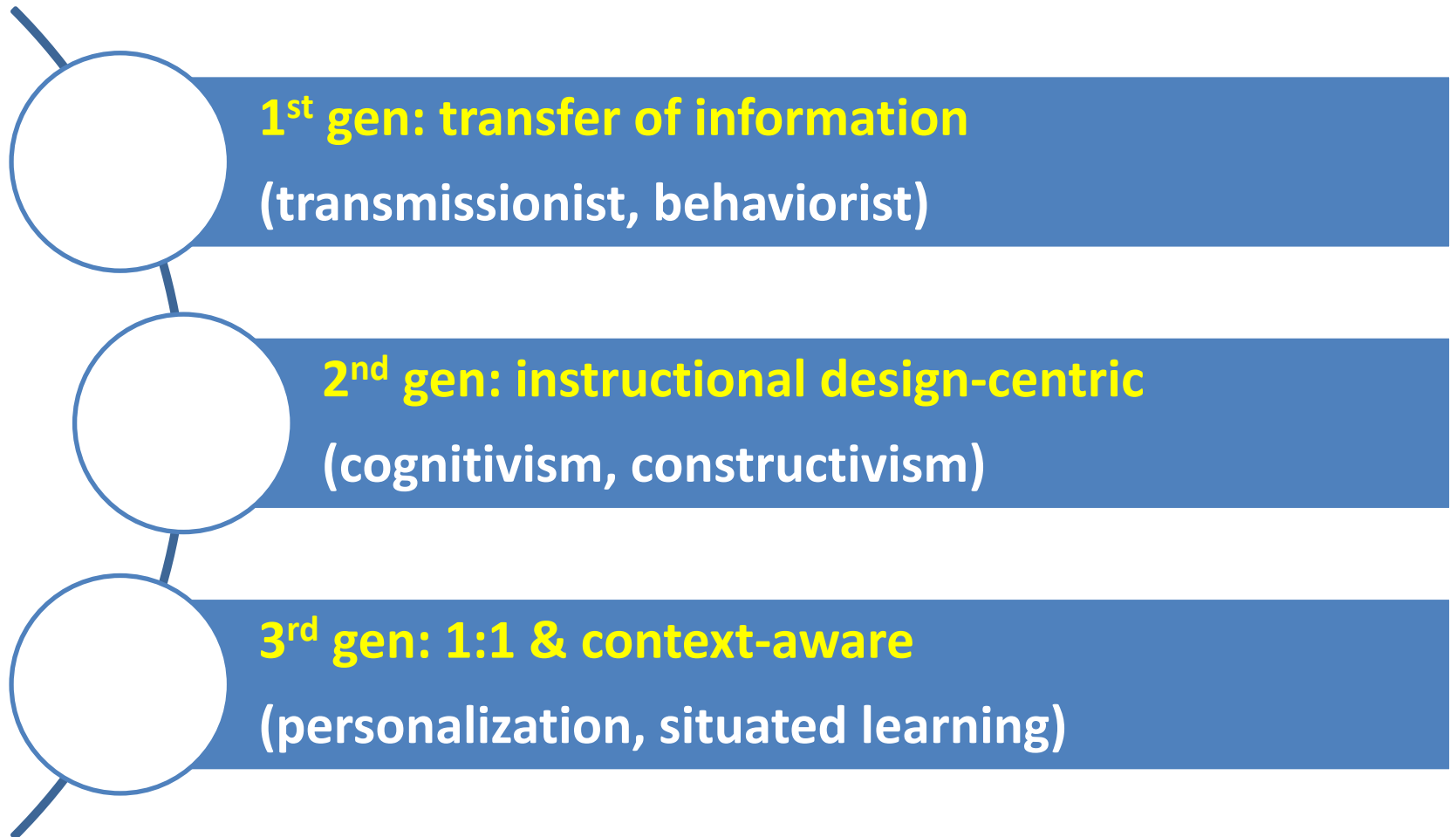
M-learning is NOT just about easy access of resources, etc.

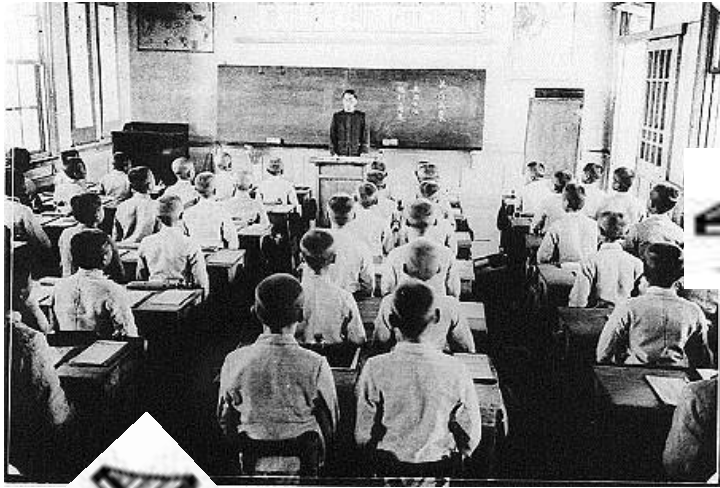


Chan, Roschelle, Hsi, Kunshuk, Sharples, Brown, et al. (2006). One-to-one technology-enhanced learning: An opportunity for global research collaboration. *Research and Practice in Technology-Enhanced Learning*, 1(1), 3-29.

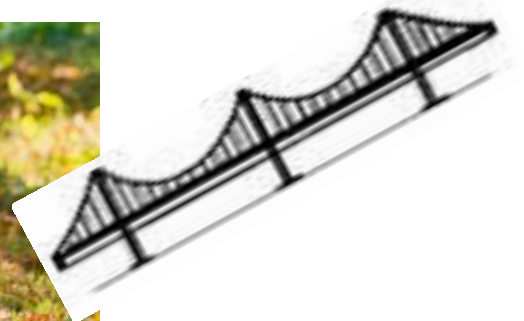
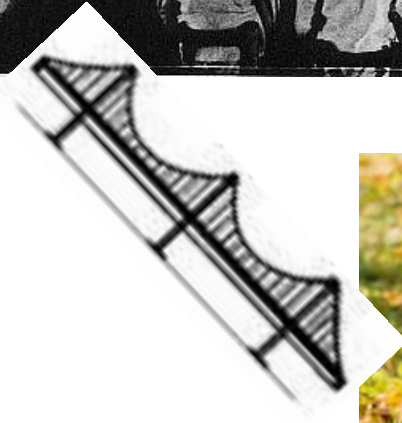
3 generations of mobile learning?

Yu (2007)





The conference planning committee has arr!



Seamless Learning



- Continuity of the learning experiences across different contexts/spaces (Chan et al., 2006)
 - Formal + informal
 - Individual + social
 - Physical + digital ...
- Mediated by: 1:1, 24x7 access to mobile devices
- Hard to tell when is the beginning and the end of learning (Sharples, 2009)
- Seamless learning $\neq$ ubiquitous learning

But, why seamless learning?

- Not feasible to equip students with all the skills and knowledge they need for lifelong learning solely through formal learning (or any other learning environment) (Chen et al., 2010)
- Learners should move beyond the acquisition of content knowledge to develop the capacity to learn seamlessly
- Nature of learning: Sense making! Construct and reconstruct your own knowledge!



Studies on seamless learning (2006-2011)

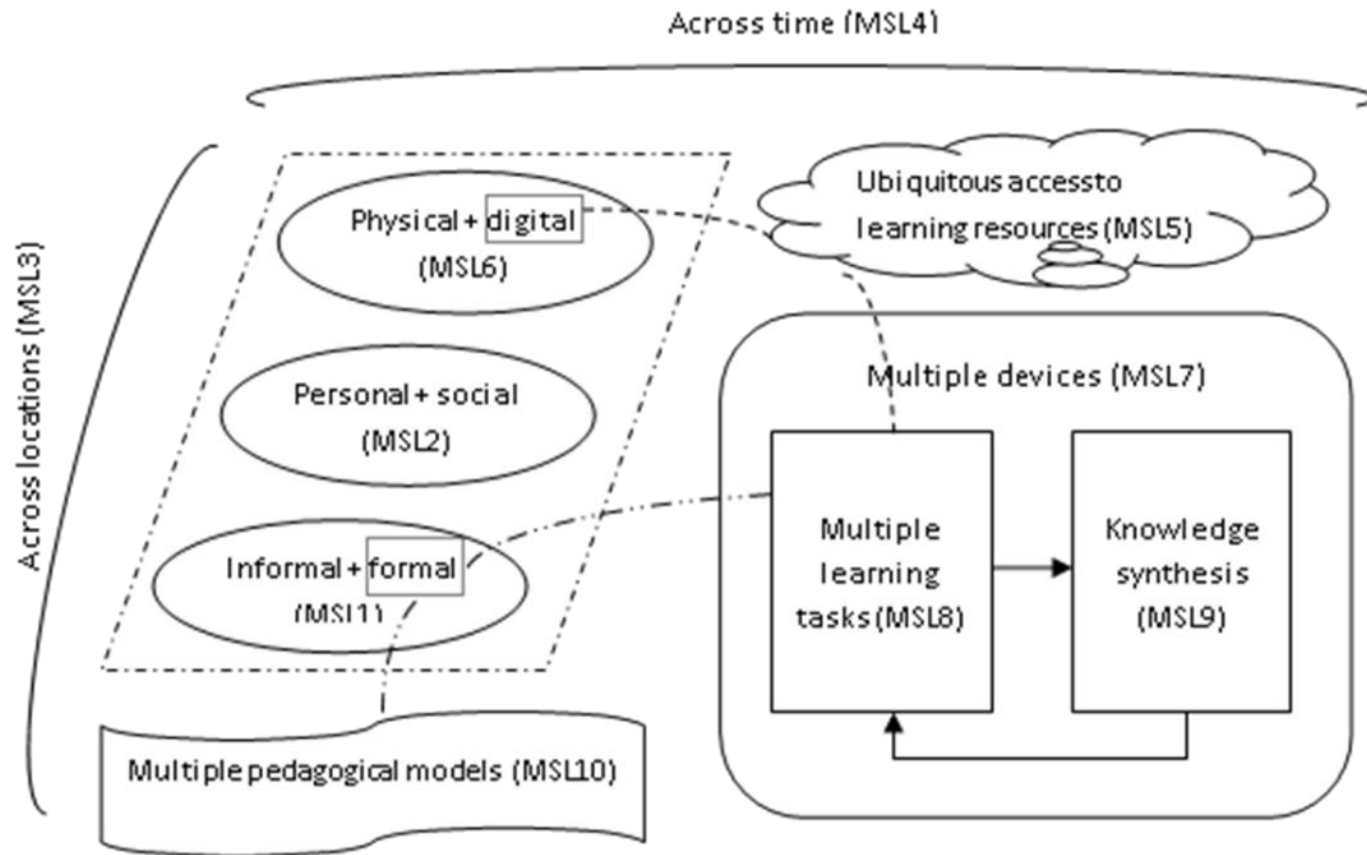
Conceptualization of 1:1 seamless learning	11	Taiwan, Australia, Singapore, Mainland China, UK, USA, Portugal
1:1 classroom learning	4	Taiwan, Mainland China, Japan
One-off or short-term 1:1 context-aware learning	19	Taiwan, Sweden, Japan, USA, Chile, UK, Germany, Singapore
Ongoing specific 1:1 seamless learning activities	9	Taiwan, USA, Japan, Mainland China, Singapore, France
Long-term 1:1, 24x7 programs	11	Taiwan, USA, UK, Pakistan, Hong Kong, Mainland China, Japan, Singapore

Wong, L.-H., & Looi, C.-K. (2011). What seams do we remove in mobile assisted seamless learning? A critical review of the literature. *Computers & Education*, 57(4), 2364-2381.

Our studies in Singapore:

1. SEAMLESS Project
2. "Move, Idioms!" → MyCLOUD

10 Dimensions of *Mobile Seamless Learning (10D-MSL)*



Wong, L.-H., & Looi, C.-K. (2011). What seams do we remove in mobile assisted seamless learning? A critical review of the literature. *Computers & Education*, 57(4), 2364-2381.

Wong, L.-H. (2012). A learner-centric view of mobile seamless learning. *British Journal of Educational Technology*, 43(1), E19-E23.

Facilitated vs Self-Directed Seamless Learning

(Facilitated Seamless Learning, **FSL**)

(Self-Directed Seamless Learning, **SDSL**)



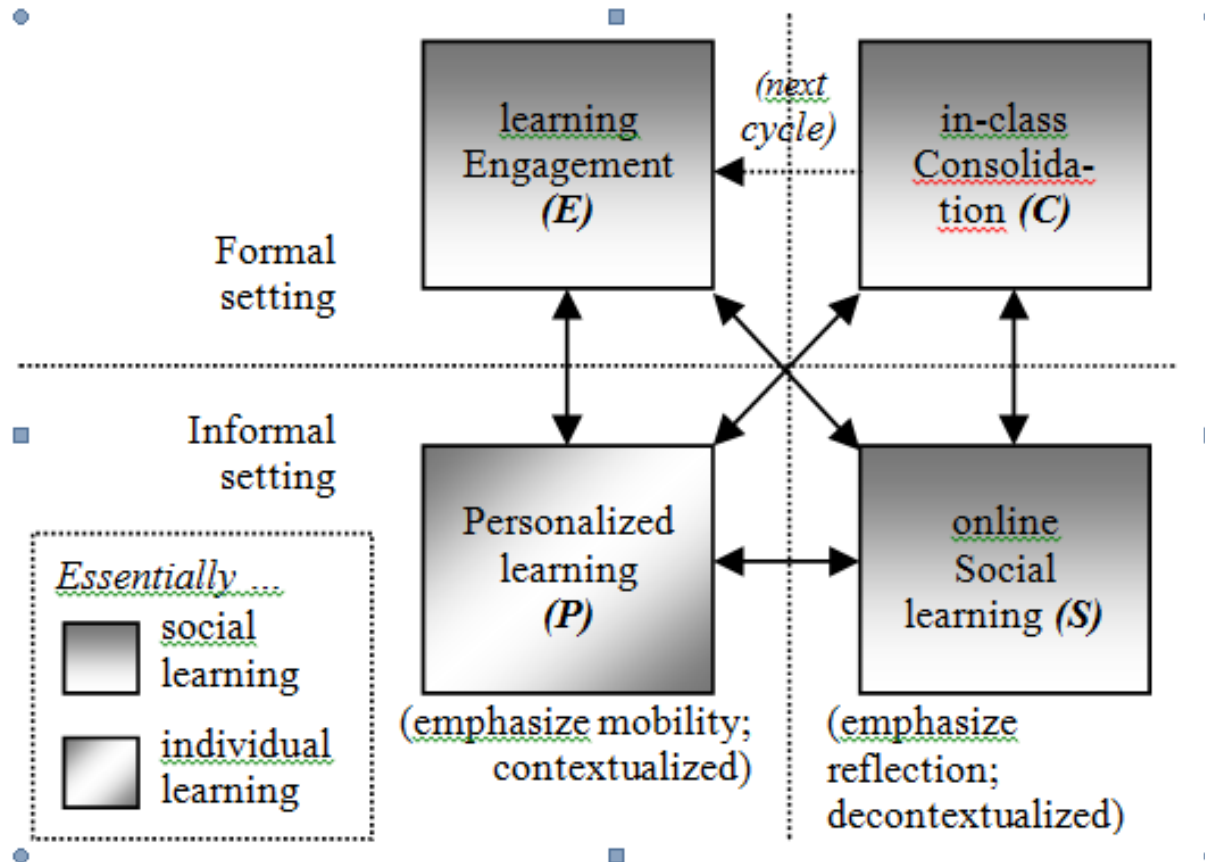
Wong, L.-H., & Looi, C.-K. (2012). Enculturing self-directed seamless learners: Towards a facilitated seamless learning process framework mediated by mobile technology. *Proceedings of the IEEE WMUTE '12* (pp. 1-8), Takamatsu, Japan.

Enculturating Seamless Learners

- *Enculturation*! –long-term *facilitated seamless learning* that engage learners in an ongoing enculturation process ...
- ... to progressively transform their existing beliefs and methods of learning ...

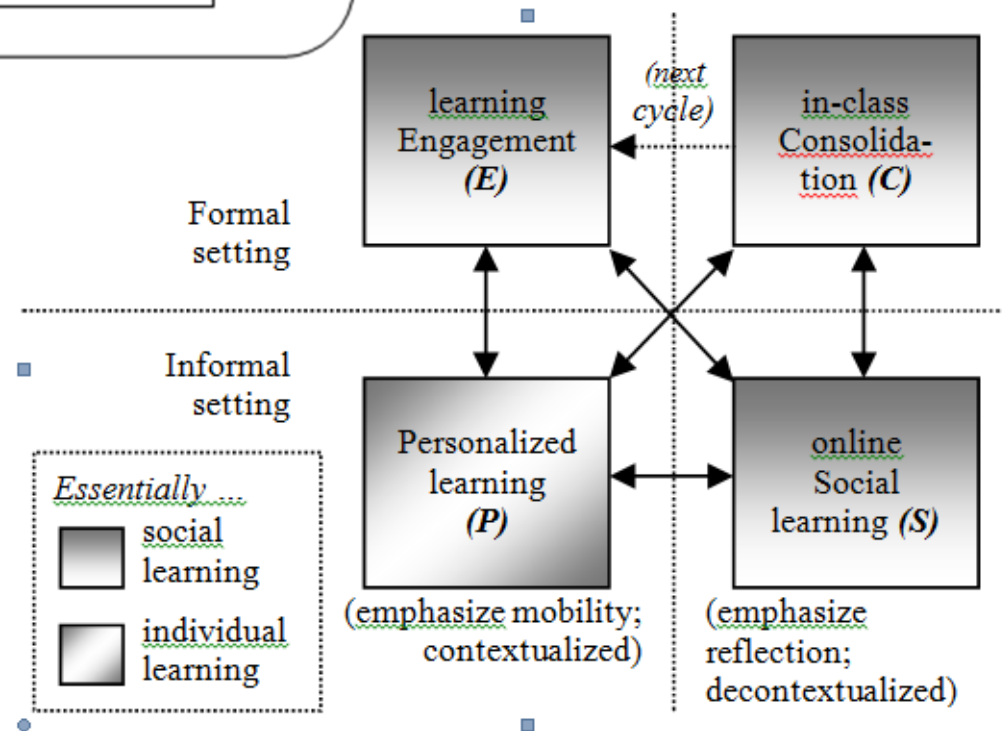


Facilitated Seamless Learning (FSL) Process Framework



Wong, L.-H. (in-press). Enculturating self-directed seamless learners through a Facilitated Seamless Learning process framework. *Technology, Pedagogy and Education*.

The diagram illustrates the MSL framework across three dimensions: time, location, and devices. The top layer, 'Across time (MSL4)', features 'Ubiquitous access to learning resources (MSL5)'. The middle layer, 'Across locations (MSL3)', includes 'Physical + digital (MSL6)', 'Personal + social (MSL2)', and 'Informal + formal (MSL1)'. The bottom layer, 'Multiple pedagogical models (MSL10)', is linked to 'MSL1'. On the right, 'Multiple devices (MSL7)' encompasses a cycle between 'Multiple learning tasks (MSL8)' and 'Knowledge synthesis (MSL9)'.



Taiwan



Japan



Singapore



Sweden



UK



Milrad, M., Wong, L.-H., Sharples, M., Hwang, G.-J., Looi, C.-K., & Ogata, H. (in-press). Seamless learning: An international perspective on next generation technology enhanced learning. In Z. L. Berge, & L. Y. Muilenburg (Eds.), *The Handbook of Mobile Learning*. Florence, KY: Routledge.

Case Study 1: SEAMLESS Project



The SEAMLESS PProject

- Purpose: to develop an educational ecology for sustainable 1:1, 24x7 seamless learning within a primary school
- Primary 3-4 science curriculum design: 12 MLE units; Design-based research
- Each students were assigned HTC TyTN II, with GoKnow MLE
- The learning flows encapsulated in the MLE units resemble the FSL process

Looi, C.-K., Seow, P., Zhang, B. H., So, H.-J., Chen, W., & Wong, L.-H. (2010). Leveraging mobile technology for sustainable seamless learning: A research agenda. *British Journal of Educational Technology*, 42(1), 154-169.

(see also: So, Kim & Looi, 2008; Sha et al., 2011; Toh et al., in-press ...)

their parts, you will be required to:

1. Identify and explain what is a system
2. Identify and state the functions of different parts of plants e.g. leaf, stem, root.
3. Compare different parts of plants e.g. leaf, stem, root according to shapes, sizes, colour and texture. State and label the transport system of the stem.

Goals of Lesson

Experiment (video)

PiCo Map

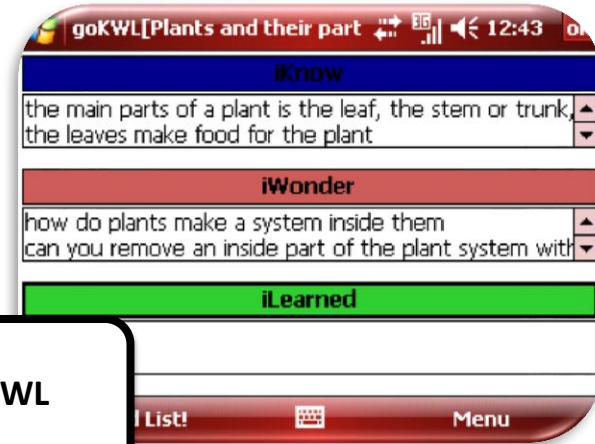
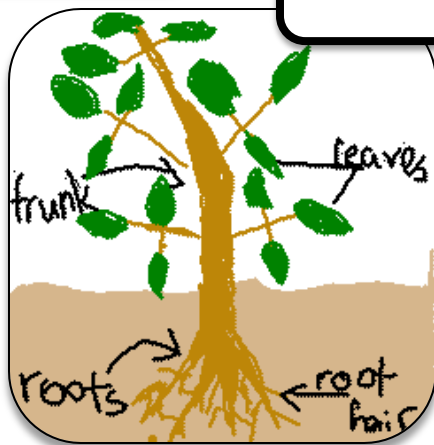
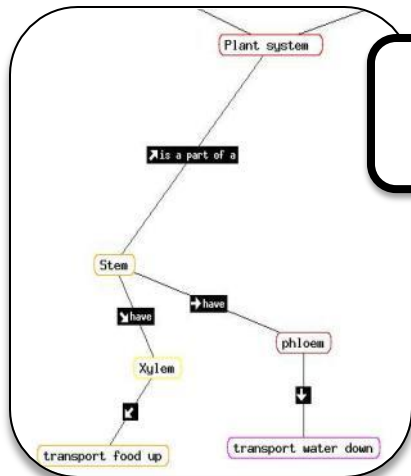
KWL

Sketchy

Comparison Table

Picture Taking

MLE Lesson Package For learning Plant Systems



mobile 12:47

Activity 3 – Functions of plant parts

Parts of plant	Functions
Roots	Help the plant to hold firmly on the ground.
Root Hair	Help plant to absorb water and mineral.
Stems	Help plant to transport water and minerals.

View Menu

The Science MLE Curriculum:

Activity Types

Activity ID	Activity Type	Mobile Affordances	Usually taking place in which FSL activity? (ref. Figure 1)
KWL	KWL activities	KWL	(P) + (C)
<u>Anim</u>	Animation creation	Sketchy	(P) + (C)
Photo	Photo taking	Built-in camera	(E) or (C)
<u>CMap</u>	Concept mapping	<u>PicoMap</u>	(P) + (C)
Discuss	Online artifact sharing & discussion	Blog / mobile forum	(S)
Field	Field trip	Video, photo & note taking tools	(E)
<u>Exp</u>	Scientific experiment		(E) or (P)
Parent	Activities involving parents	Video & other tools	(P)
Web	Web search & media playing	IE, YouTube app	(E) or (P) or (S)
<u>Collnq</u>	In-situ multimedia content creation & forum discussion	<u>Collnq</u>	(P) + (S)

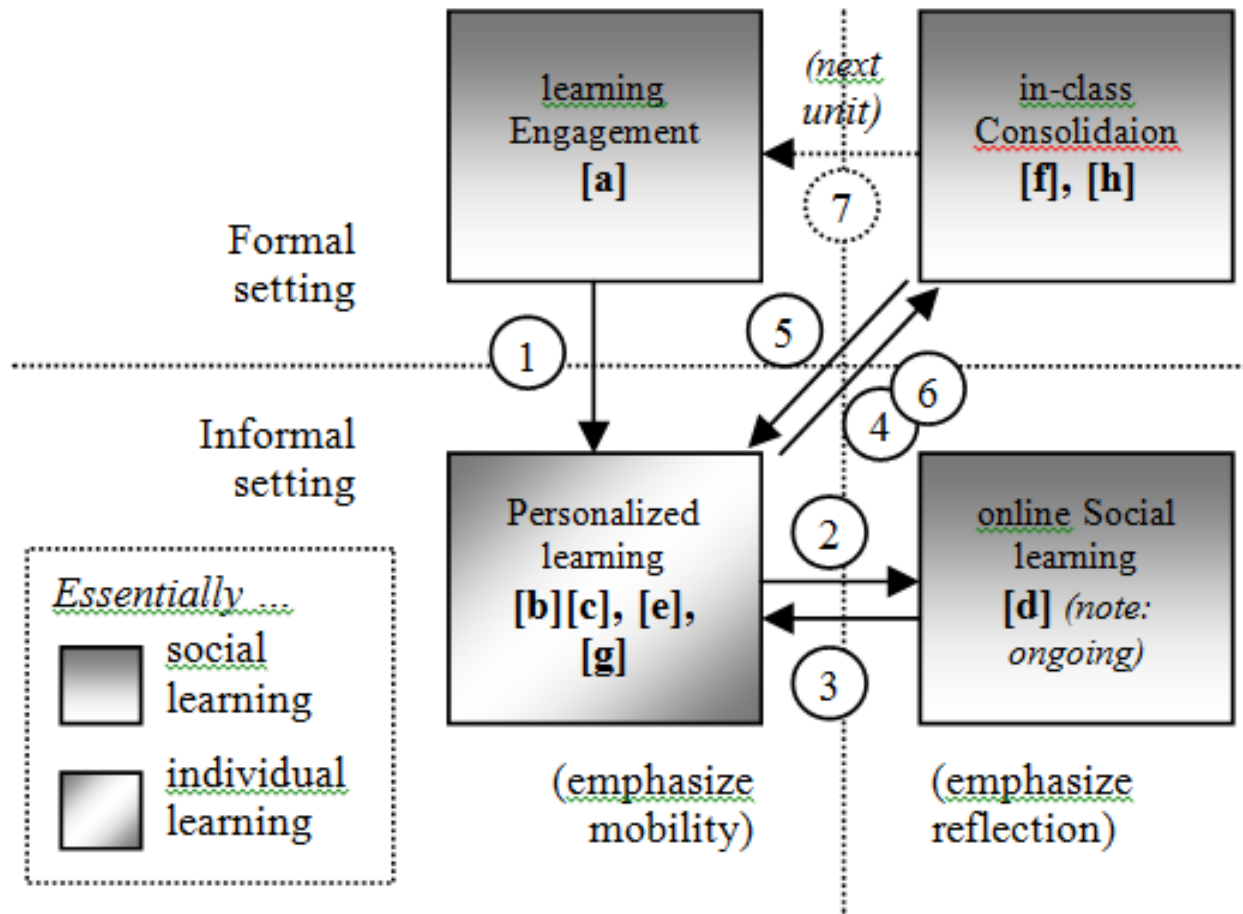
The Science MLE Curriculum: Systematic Variation of Activities

Unit ID	Topic	KWL	Anim	Photo	CMap	Discuss	Field	Exp	Parent	Web	Collng
U1	Living & non-living things	√									
U2	Animals	√	√								
U3	Plant	√	√	√	√						
U4	Plants & their parts	√	√	√	√	√					
U5	Fungi	√	√	√	√		√				
U6	Materials	√	√	√	√			√			
U7	Body systems	√	√						√	√	
U8	Cycles	√	√			√	√			√	
U9	Matter	√	√	√							
U10	Light & shadow		√					√			
U11	Heat & Temperature	√	√	√							
U12	Magnet		√		√			√	√	√	√

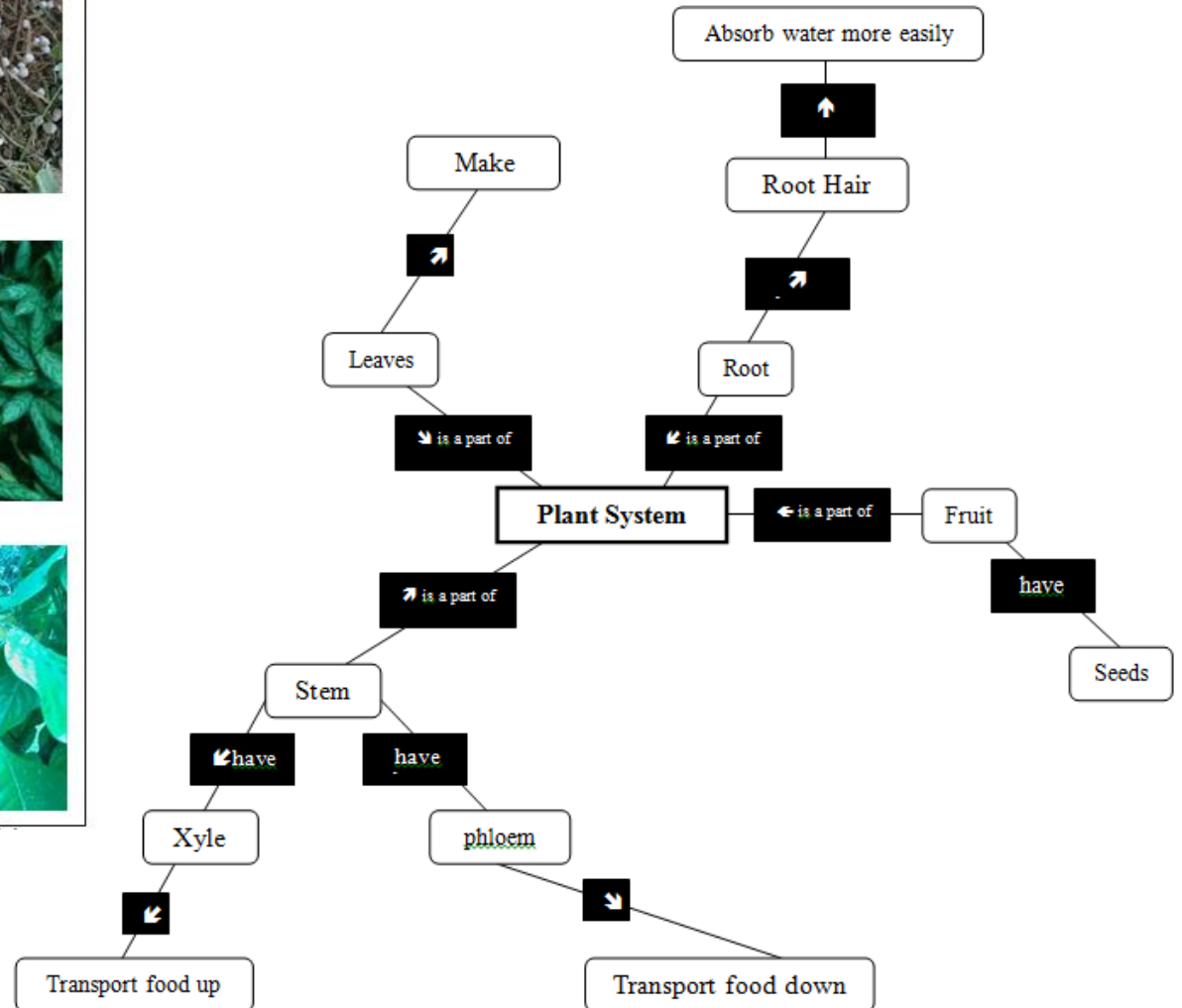
Zhang, B. H., Looi, C.-K., Seow, P., Chia, G., Wong, L.-H., Chen, W., et al. (2010). Deconstructing and reconstructing: Transforming primary science learning via a mobilized curriculum. *Computers & Education*, 55(4), 1504-1523.

Song, Y., Wong, L.-H., & Looi, C.-K. (in-press). Fostering personalized learning in science inquiry supported by mobile technologies. *Educational Technology Research and Development*. doi: 10.1007/s11423-012-9245-6.

Example: U4 – Plants & Their Parts



Selected Students Artifacts from U4

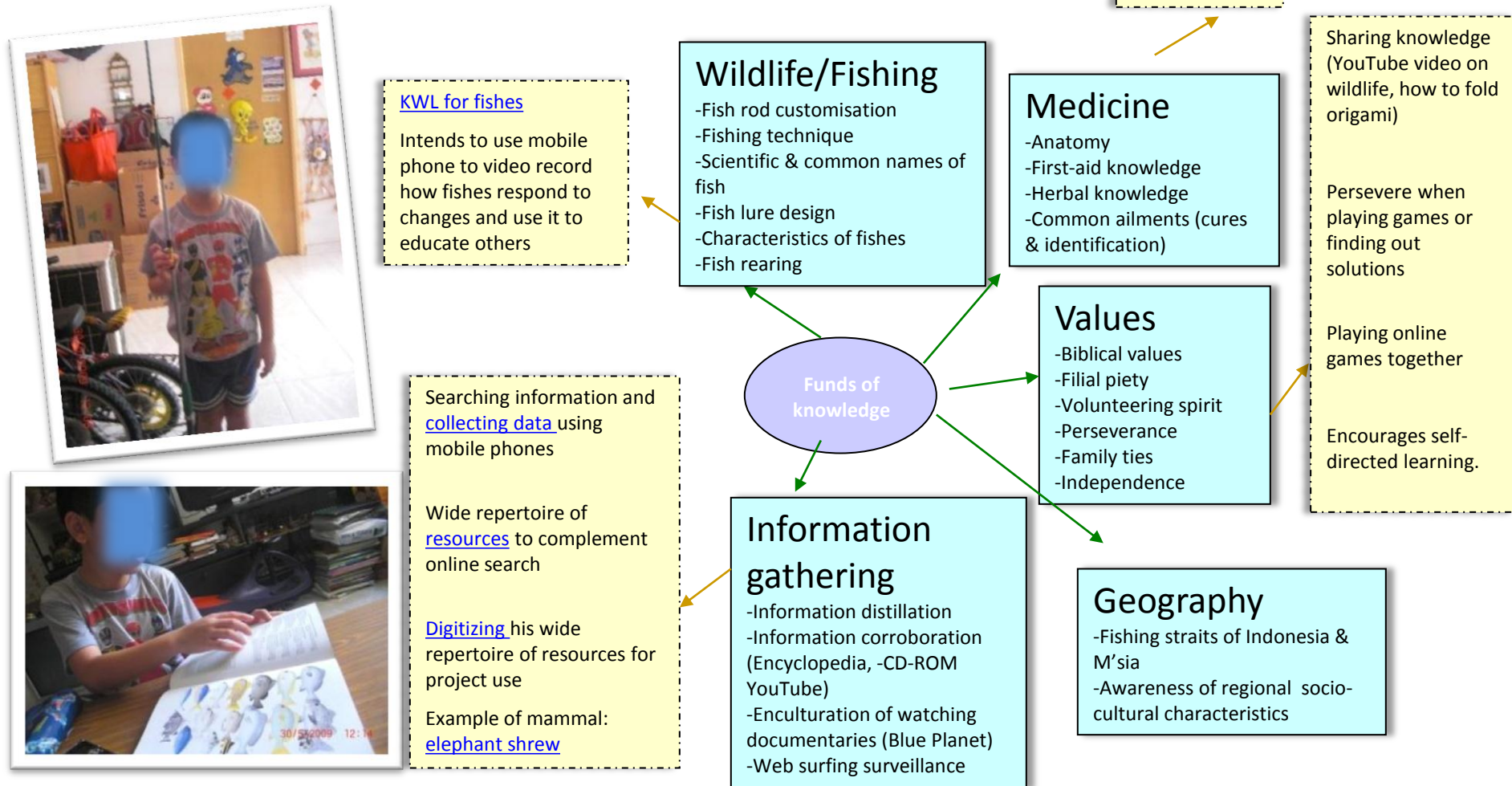


So ... how self-directed-ness was gradually nurtured?

- 2 salient characteristics of m-learning: mobility & personalization →
 - Bringing students 'back' to the physical reality!
 - Blending their learning into their daily life with less structured activities ... greater learner agency!
 - Students to be observant! Grab spontaneous learning opportunities! Actively making meaning!
 - Suit different learning paths and learning styles!

Looi, C.-K., Wong, L.-H., & Song, Y. (in-press). Discovering Mobile Computer Supported Collaborative Learning. In C. Hmelo-Silver, A. O'Donnell, C. Chan & C. Chinn (Eds.), *The International Handbook of Collaborative Learning*. New York: Routledge.

• Our ethnographic study



Chen, W., Seow, P., So, H.-J., Toh, Y., & Looi, C.-K. (2010). Extending students' learning spaces: Technology-supported seamless learning. *Proceedings of the International Conference on Learning Sciences 2010* (pp. 484-491), Chicago, USA.

Case Study 2: “Move, Idioms!”



“Move, Idioms!” 成语，动起来！

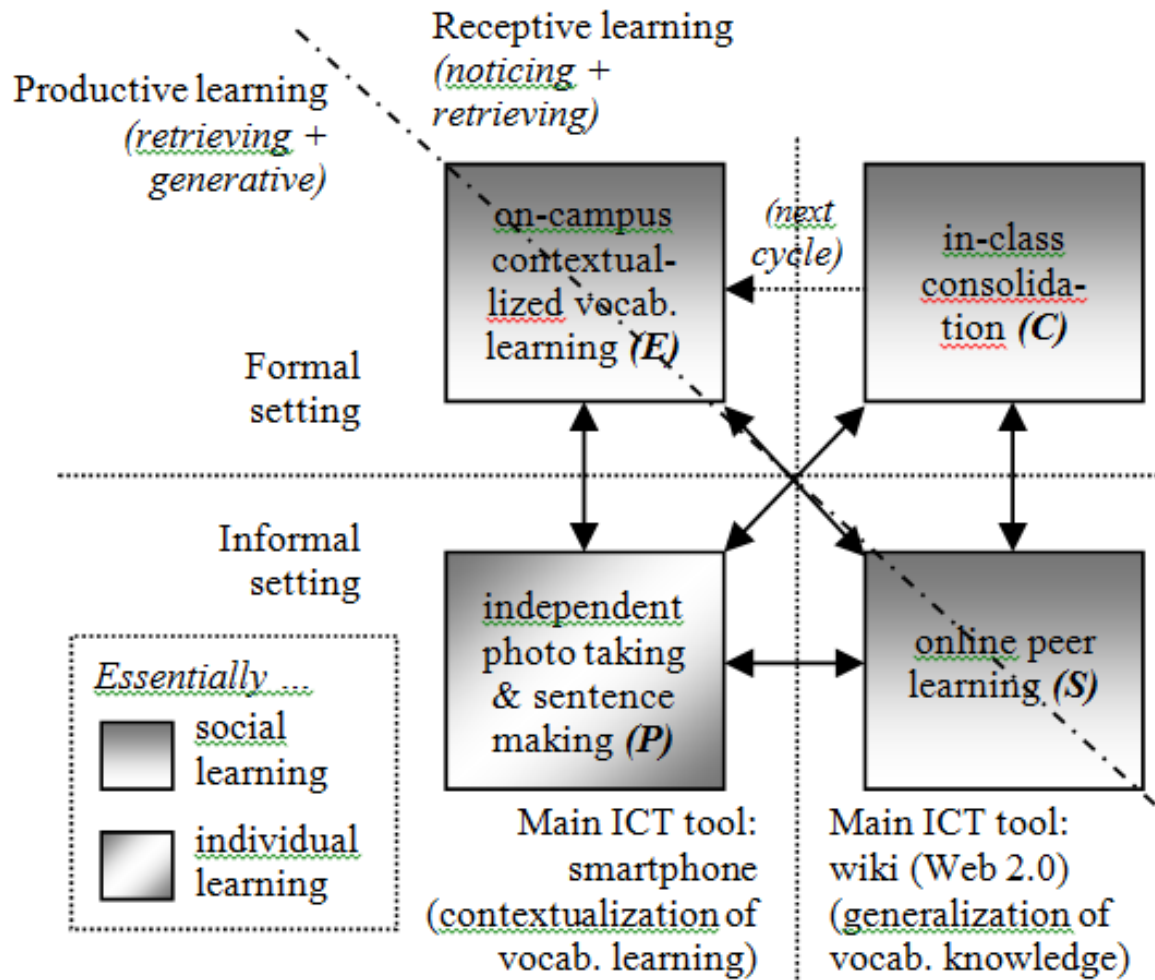
- Design-based Research, Feb-Nov 2010
- 48 Chinese idioms + 8 conjunctions
- 34 students from P5 class, 1:1, 24x7 access to Samsung Omnia II
- Used open-source xwiki to create a wiki space for artifact sharing & peer reviews

Wong, L.-H., Song, Y., Chai, C.-S., & Zhan, Y. (2011). Analyzing students' after-school artifact creation processes in a mobile-assisted language learning environment. *Proceedings of ICCE '11* (pp. 349-356), Chiang Mai, Thailand.

Wong, L.-H. (in-press). Analysis of students' after-school mobile-assisted artifact creation processes in a seamless language learning environment. *Educational Technology & Society*.



Applying FSL Framework to Design...



Designed 8 cycles of FSL activities in an ongoing basis; in each cycle ...

Wong, L.-H., Chen, W., & Jan, M. (in-press). How artefacts mediate small group co-creation activities in a mobile-assisted language learning environment? *Journal of Computer Assisted Learning*. doi: 10.1111/j.1365-2729.2011.00445.x

Examples of Student Artifacts

Idioms	Artifact created within the school	Artifact created at home	Artifact created in other locations
东倒西歪 Rickety	 (the student manipulated the chair and the ball to create the context for the artifact)	 (the student manipulated the standing fan at home)	 (a tree at the neighborhood; the twisted camera angle further highlights the meaning of the idiom)
争先恐后 Striving to be the first	 (students enacting a scenario)	 (Singapore dollar notes on the floor)	 (a standee in a cinema)
指手画脚 Gesticulating	 (a visiting educator from Kuwait pointing his finger at the students)	 (a student's nagging father)	 (street performers outside a museum)

From Personal Meaning Making to Social Meaning Making

- Artifact creation – personally or with peers/family members
- Online peer learning

Wong, L.-H., & Looi, C.-K. (2010). Vocabulary learning by mobile-assisted authentic content creation and social meaning making: Two case studies. *Journal of Computer Assisted Learning*, 26(5), 421-433.

Wong, L.-H., Chin, C.-K., Tan, C.-L., & Liu, M. (2010). Students' personal and social meaning making in a Chinese idiom mobile learning environment. *Educational Technology & Society*, 13(4), 15-26.



Student Artefacts: Social Meaning Making

- ❖ Learning from peers vs. learning with peers
- ❖ Online discussion vs. in-class consolidation
- ❖ inductively construct generalized vocab knowledge

 (L)这个橱柜上的东西摆得东倒西歪。 The objects in the cupboard are <u>rickety</u>.	 (M)我的水壶东倒西歪，翻倒了 My bottle is <u>rickety</u> and lied down.	 (N)哥哥的书柜的书东倒西歪，非常乱！ The books in my brother's bookcase are <u>rickety</u> and disorder!	 (O)哥哥把书桌弄得东倒西歪。 My brother makes his study desk <u>rickety</u>.
---	---	--	--

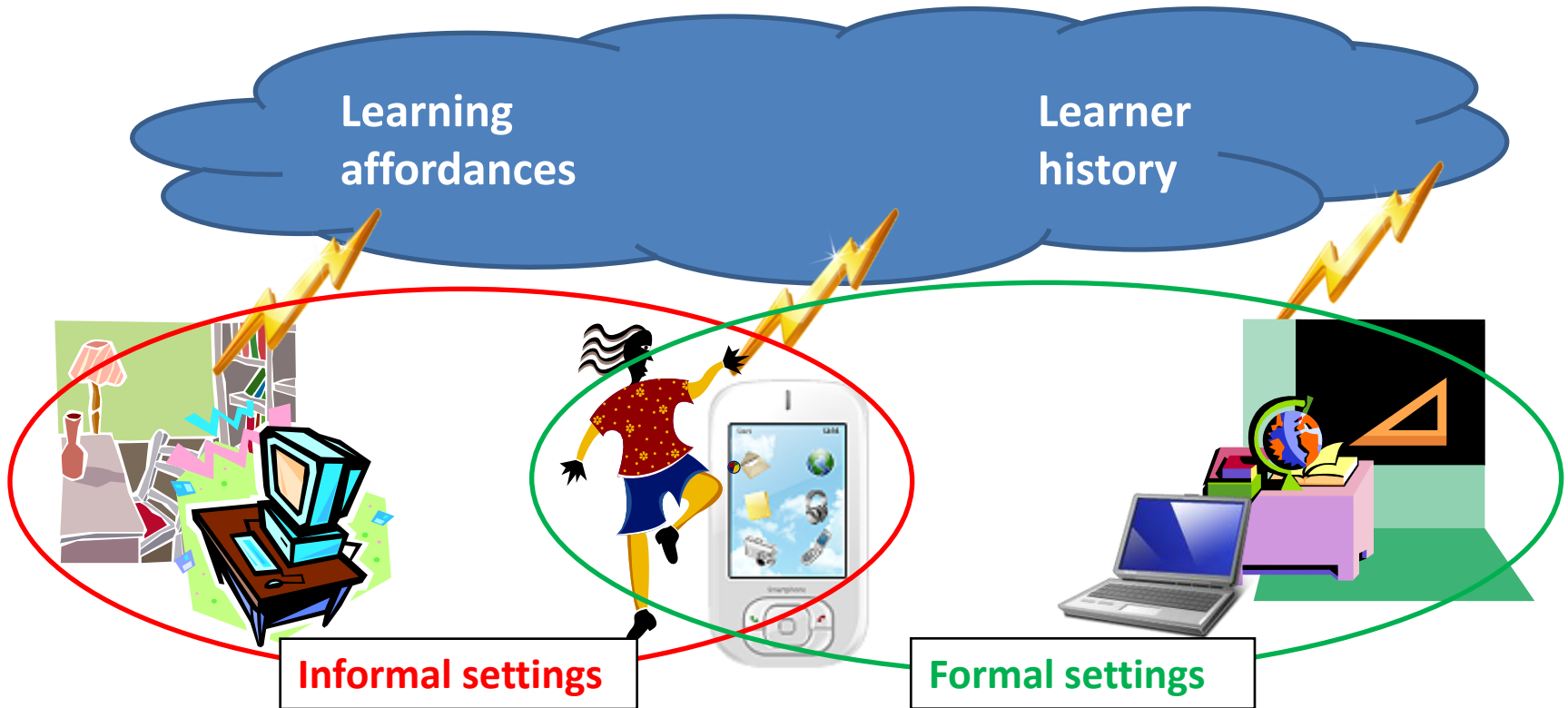


❖ Personal-to-social meaning making

pushing the boundary of the learning materials

Can Mobile & Ubiquitous Technology Help?

- Personalized mobile device as a ***'learning hub'***
 - Learning affordances + learner history (Wong, 2012)



Follow-up Project: MyCLOUD 语飞行云

- My Chinese Language ubiquitOUs learning Days
- MOI signed on Oct 7, 2010
 - National Institute of Education
 - Singapore Centre for Chinese Language
 - Nan Chiau Primary School
 - Microsoft Singapore



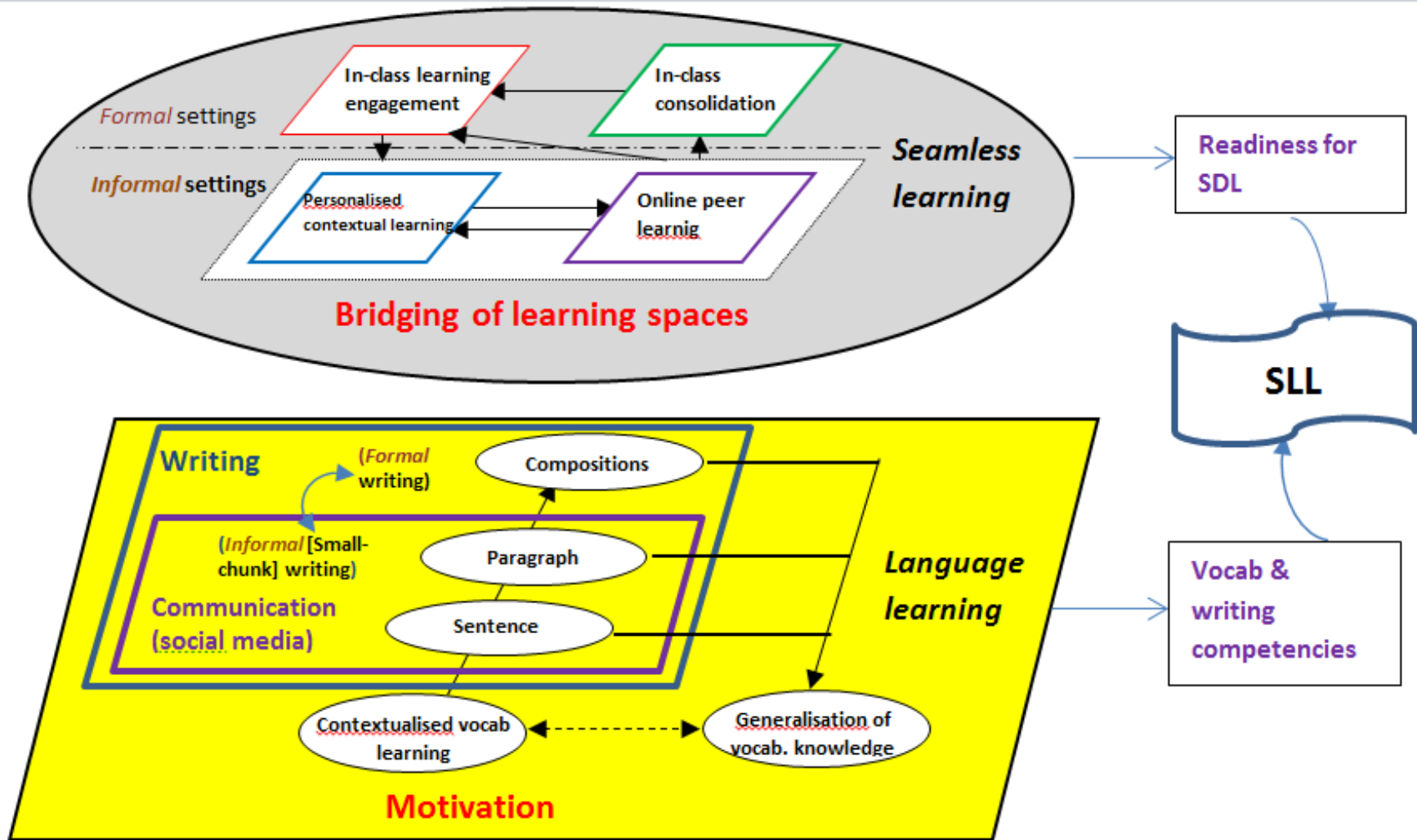
MyCLOUD

- A socio-techno-pedagogical framework to guide the learning design
- New platform (mobile + cloud computing)
 - My Mictionary 我的C动词典; CoMictionary
 - Integration into formal class, revamping classroom pedagogy
 - Scalability: platform will be device-independent
 - Integrating linguistic technologies developed by Microsoft Research Asia, Beijing



Wong, L.-H., Chai, C.-S., Chin, C.-K., Hsieh, Y.-F., & Liu, M. (2012). Towards a seamless language learning framework mediated by the ubiquitous technology. *Accepted by: International Journal on Mobile Learning and Organisation*, 6(2), 156-171.

The Socio-Techno-Pedagogical Framework



Wong, L.-H., Aw, G., Chai, C.-S., & Liu, M. (in-press). MyCLOUD: A seamless language learning environment for vocabulary learning and formal-informal cycles of writing activities. *Workshop Proceedings of the International Conference on Computers in Education 2012*, Singapore.



No
Photo

你好! Wong Lung
Hsiang 我的档案

查看所有信件

书写新信件

加入新提醒

第一课：懂事的丽文

阅读课文

第一课：懂事的丽文

创建者：Quek Guan Hui

丽文家楼下住着一位老爷爷。
昨天，老爷爷病了，医生要他躺在床上好好休息几天。
丽文放学回家时，看见桌上有一张便条：
丽文：
楼下的老爷爷病了，你做事时小心点儿，不要吵到他。
妈妈
1月15日
上午8点
丽文看了便条后，就轻轻地走路，轻轻地脱鞋，轻轻地关门……连看电视也把音量调得很小。但是客厅里的椅子不听话，震动的时候就会碰到地板，发出响声。怎么办呢？丽文想了想，找出一些旧毛巾，把椅子的脚一只一只包起来，家里一下子安静多了。
爸爸妈妈回来看见了，说：“我们家的椅子也听话了，像丽文一样懂事，一样乖。”

乐学

[第一课：懂事的丽文](#)

[第二课：藏起来的话](#)

[第三课：友谊桥](#)

[第四课：我多想](#)

[第五课：和书一起飞](#)

善用



百宝箱



During
classroom
lesson ...

Highlight & right
click ...



My Mictionary ...

我的C动词典

+ 搜索

便条 biàn tiáo 

标签:

名词

更新标签

你用了这个词 0 次。

上次更新: 无数据

[回到我的C动词典](#)

(informal) note

上传照片/造句

同学们怎么用?

我的笔记:

加入笔记

老师加意见

没有造句。

没有笔记。

我的造句

- 我回到家，就看到妈妈在冰箱上的便条，叫我自己吃冰箱里的三明治。



***How did my
classmates use
it? ...***

同学们怎么用 便条

No
Photo

[Wong Lung Hsiang] (10月3日 11:03 AM)

我回到家，就看到妈妈在冰箱上的便条，叫我自己吃冰箱里的三明治。



回复



[WONG WAI KIT, NICHOLAS] (8月12日 8:39 PM)

爸爸流一张便条,告诉我他没有回来吃饭

回复



[刘] (5月31日 5:24 PM)

雯雯写了一条便条给老板，提醒他收拾行李。



[Quek Guan Hui] (6月1日 12:52 PM)

为什么要提醒他收拾行李？

No

[TAN MING WEI, WILLIAM] (8月11日 10:22 AM)

***Social
Networking ...
more personalized***

 祝大家恭喜发财，万事如意和学业进步！

 [SOH JIA YING VELEDA] (01月27日 9:41 PM)

越来越多红包！

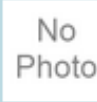


 [GOH JIA YONG] (02月01日 4:51 PM)

不错！

 [GOH JIA YONG] (02月01日 4:52 PM)

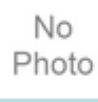
: >

 [TAN MING WEI, WILLIAM] (02月05日 4:15 PM)

安静巴。

 [TOH JIA XIN JOEY] (02月08日 3:18 PM)

好美的红包！ :)

 [TAN MING WEI, WILLIAM] (01月21日 1:38 PM)

多多红包



 [SOH JIA YING VELEDA] (01月27日 10:10 PM)

So, what has our MSL research informed the field so far?

- Longer term, multi-cycle SL design
 - ... to enculturate students towards self-directed seamless learners
 - Systematic variation of activity design across FSL cycles to facilitate learners' progressive growth in both content knowledge & SL skills/mindset
- A spiral style design:
 - in present cycle, target knowledge to learn, learning activity types, skill sets to learn & apply, mobile affordances to use, and student artifacts to reuse & create, are all building on or rising above previous cycles.



Seamless or *Active*?



Seamless AND *Active*?

The Research Team of SEAMLESS Project



The Research Team of “Move, Idioms!”



The Research Team of MyCLOUD





The 20th ICCE 2012

International Conference on
Computers in Education

NOVEMBER 26 - 30, 2012

National Institute of Education, Singapore

Organized by Asia-Pacific Society for Computers in Education

<http://apsce.net>

Hosted by National Institute of Education, Nanyang Technological University, Singapore

<http://lsl.nie.edu.sg/icce2012/>

The End ... is a New Beginning!



Lunghsiang.wong@nie.edu.sg