Sustainable Seamless Learning: What have we learned and where are we going?

可持续性无缝学习研究成果及发展趋向

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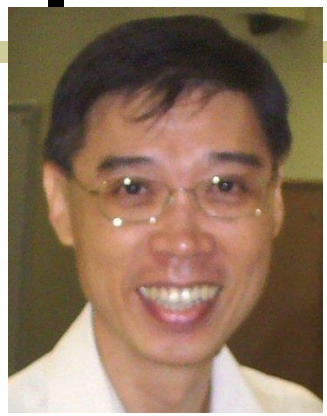
Acknowledgements: Seamless Learning Team











Tribute to

- First generation Mobile Learning researchers like
  - Mike Sharples,
  - Hiroaki Ogata,
  - Roy Pea,
  - Jeremy Roschelle,
  - Elliot Soloway,
  - Cathy Norris,
  - Miguel Nussbaum
  - Tak-Wai Chan,
  - Agnes Kululska-Hulme,
  - Kinshuk,
  - Mohamed Ally, etc

Where are we coming from?

- Many countries are going 1:1, what is a good pedagogical model that is sustainable?


The New York Times

Education

Seeing No Progress, Some Schools Drop Laptops

New York Times, May 4, 2007
A day that will live in infamy for educational technologists

Where are we also coming from?

- How to bridge formal and informal learning

- Whither role of mobile technologies?

Planned and emergent learning spaces mediated by 1:1 mobile devices

	Planned	Emergent
Out Class	***Type II*** **Planned learning out of class** E.g. Field trip to heritage site which is part of a school curriculum 	***Type III*** **Emergent learning out of class** E.g. Using mobile phones to capture pictures and video clips of animal and directed by self-interest 
In Class	***Type I*** **Planned learning in class** E.g. Searching for answers in the classroom 	***Type IV*** **Emergent learning in class** E.g. teachable moments not planned by the teachers 

Seamless Learning: What seams to remove?

- **continuity of the learning experience across different scenarios or contexts**
  - between formal and informal contexts
  - between individual and social learning
  - extending the social spaces
- **one device or more per student**

(Chan et al 2006)

Overview of presentation

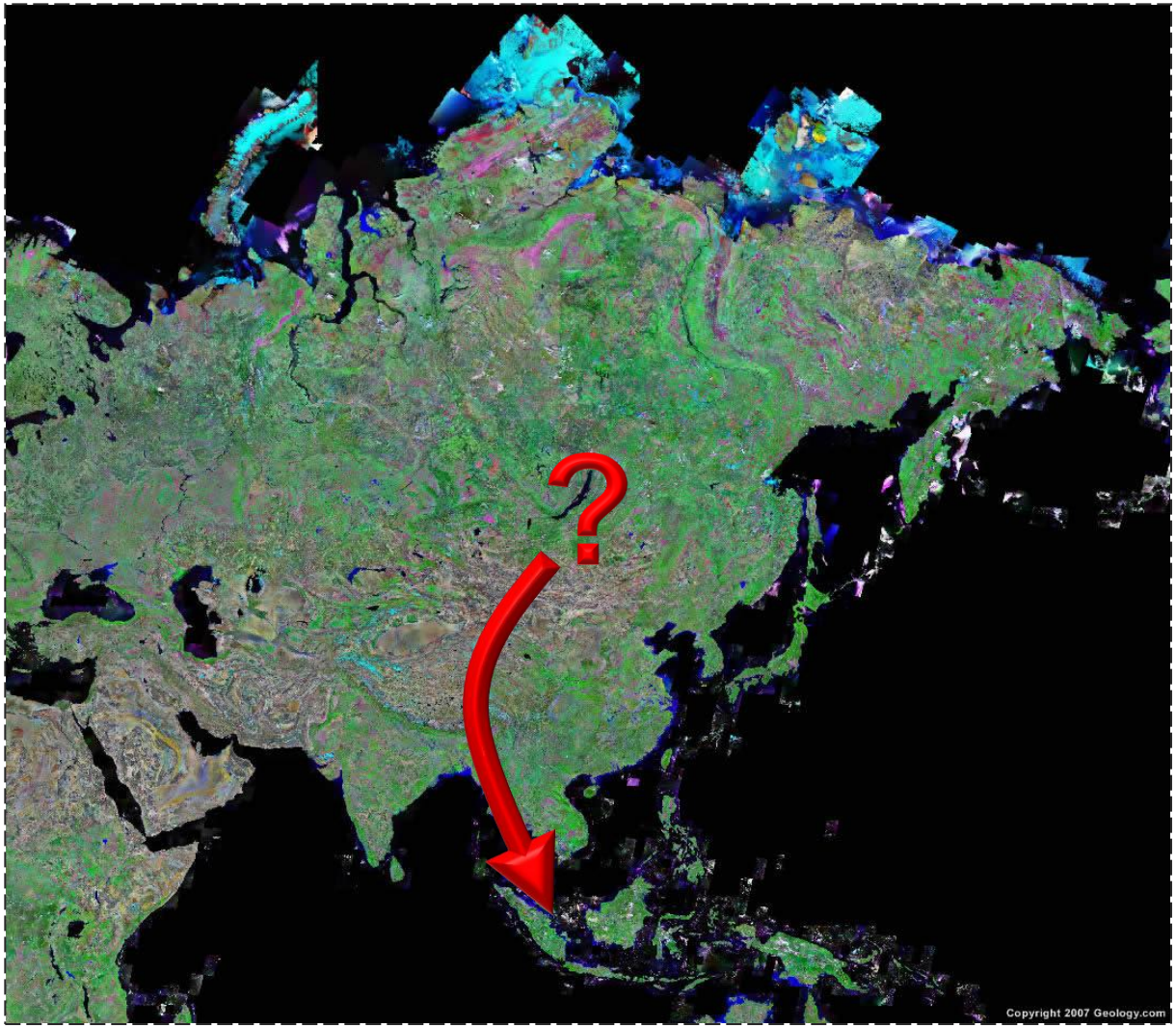
- Share our experiences with seamless learning
  - 1:1 learning in the classroom
  - Informal learning outside classroom
- Possible future research directions

The story …

Mobile learning mediating
in and out of classroom learning
in a Singapore classroom

Where is Singapore?

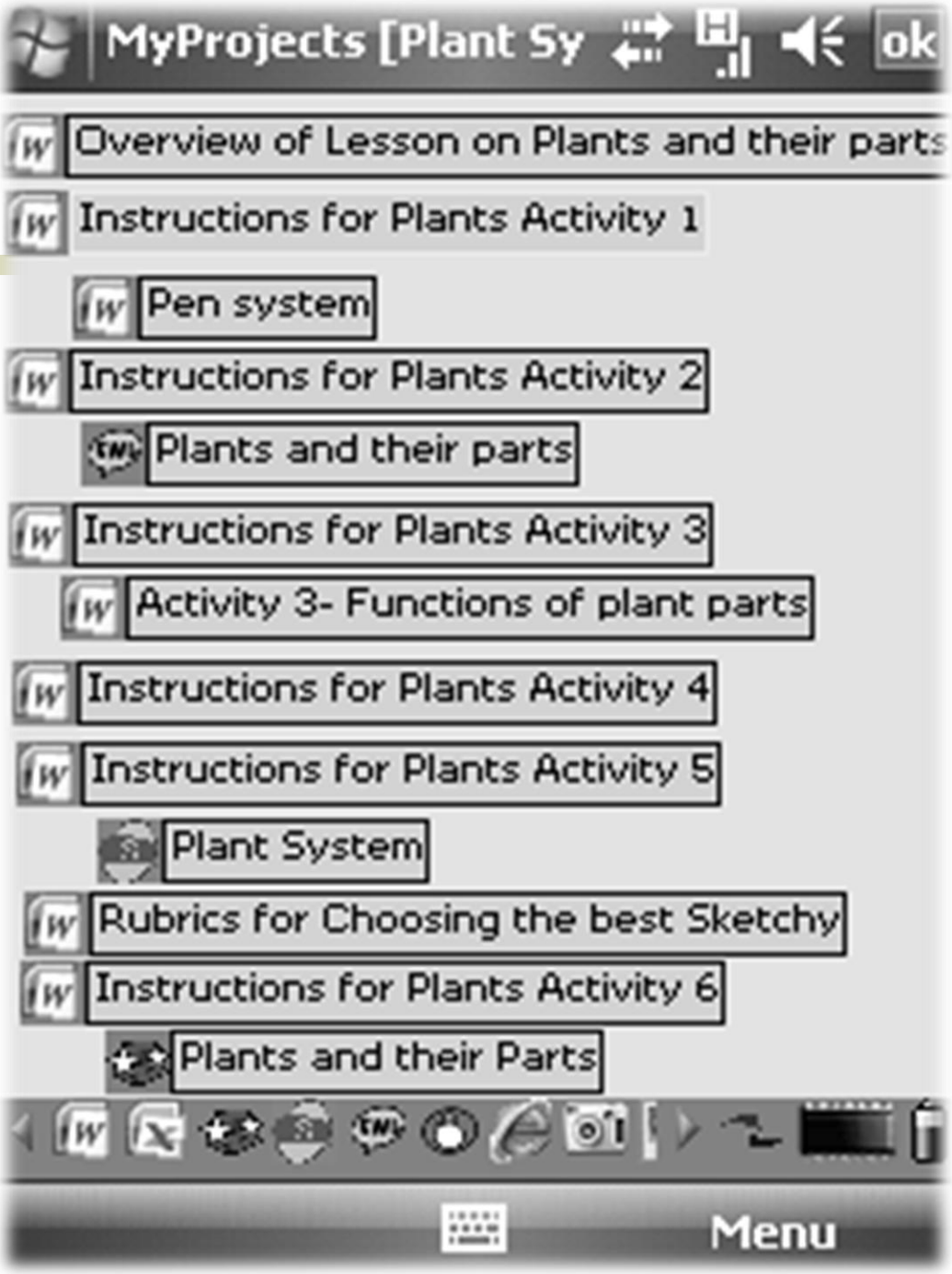
Where is Singapore?



1:1 learning in the classrooms

Mobilized science lessons in a Primary 3 class


MyProjects [Plant Sy
Overview of Lesson on Plants and their part
Instructions for Plants Activity 1
Pen system
Instructions for Plants Activity 2
Plants and their parts
Instructions for Plants Activity 3
Activity 3- Functions of plant parts
Instructions for Plants Activity 4
Instructions for Plants Activity 5
Plant System
Rubrics for Choosing the best Sketchy
Instructions for Plants Activity 6
Plants and their Parts
Menu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Menu

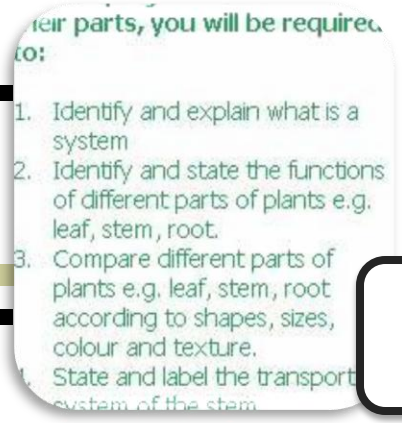
Design principles

- Design student-centered learning activities
- Make students' thinking process visualizable
- Incorporate different learning modalities
- Design for holistic and authentic learning

Design principles

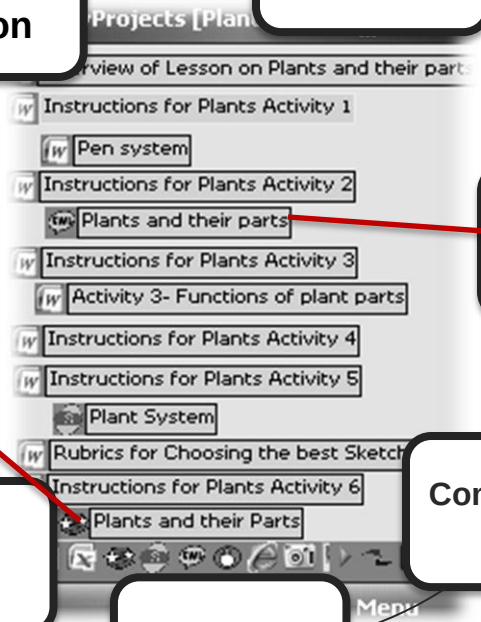
- Ensure that the teacher plays the role of facilitator (to move away from didactic teaching)
- Provide an environment to integrate all learning activities (students have a hub to launch or continue their learning activities)
- Assess formatively
- Extending classroom learning activities beyond school hours and premises

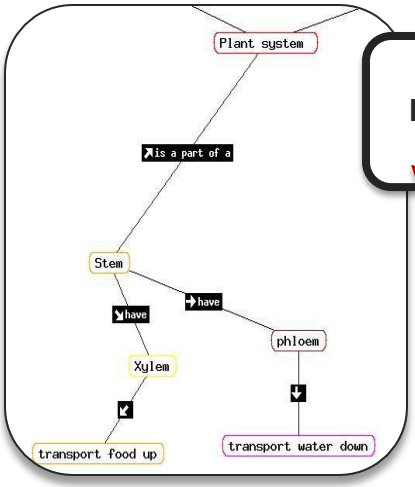
MLE Lesson Package For learning Plant Systems



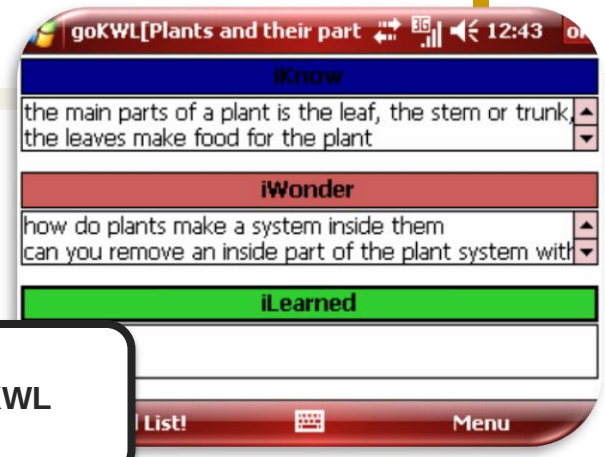
Goals of Lesson

Experiment (video)



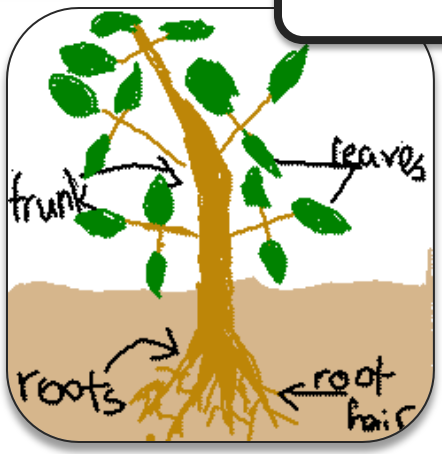


PiCo Map



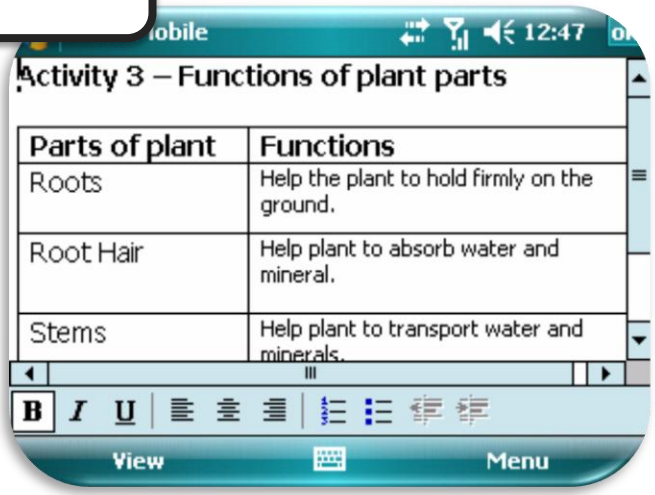
KWL

Sketchy



Picture Taking

Comparison Table



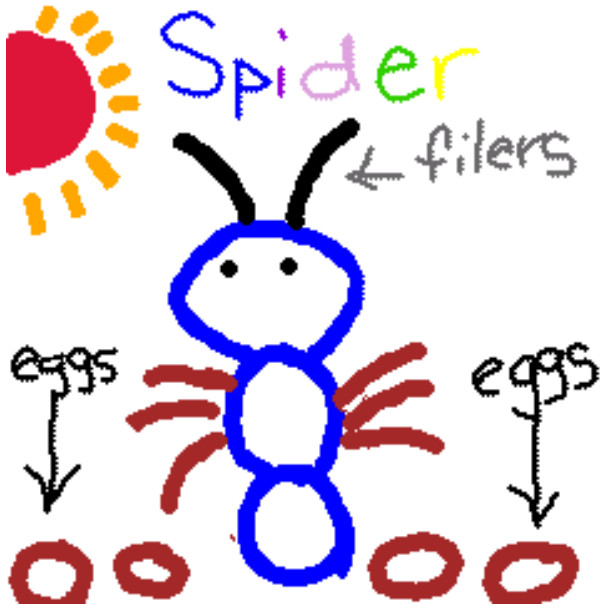
Some students work in Sketchy

A sample of a Grade 4 students work on Sketchy showing the characteristics of living things:

Grow
Reproduce
Movement
Die

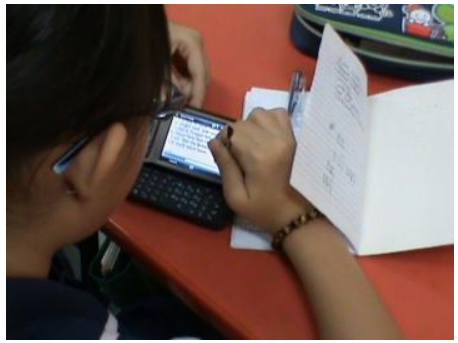
A sample of student's Sketchy

A student's Sketchy showing a spider with characteristics of an insect. The teacher can see the child's misunderstanding of classifying spiders as insects.



She can show a picture of a spider to the class and ask whether spiders can be classified as insects.

Supplemental OR essential



- Add-on: Apps
- Essential: Mobile platform as learning hub

Norris & Soloway, 2010 at http://www.districtadministration.com/viewarticle.aspx?articleid=2405)

How did the class with the mobilized curriculum for a whole school year perform?

6 mixed ability classes in the primary school

One class with mobilized curriculum intervention

Impact on Test Scores

Significant difference on year-end science exam scores among the 6 mixed-ability classes after controlling the exam scores (before the introduction of mobilized lessons) constant

Class difference explains 41% of the variance in year-end exam scores

The intervention class has the highest exam scores among all the mixed-ability classes!

Video of seamless learning project in a Singapore primary school

Informal Learning Out of Class

Initial Challenges

- How to define informal learning
- How to capture “seamless”

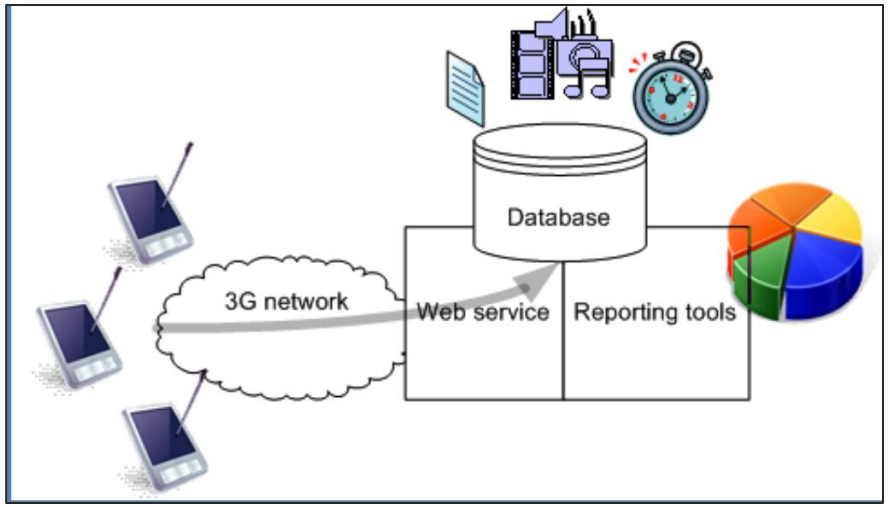
Learning across time & space

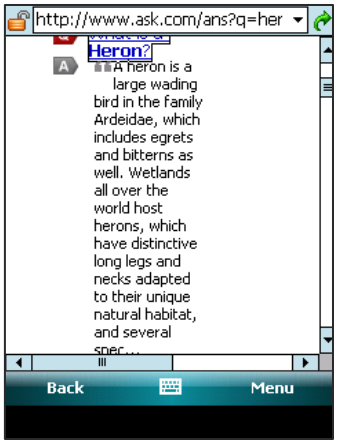
Out Class	***Type II*** **Planned learning out of class** Home visits Science Centre Data Field trips Quiet Captures Artefacts Surveys 	***Type III*** **Emergent learning out of class** Home visits Science Centre Data Quiet Captures Artefacts Surveys Focus Groups 
In Class	***Type I*** **Planned learning in class** Home visits Lesson Observations Quiet Captures Artefacts Surveys Focus Groups Academic results 	***Type IV*** **Emergent learning in class** Home visits Lesson Observations Quiet Captures Artefacts Surveys 
	Planned	**Emergent**

Chen, W., Seow, P., So, H. J., Toh, Y., & Looi, C.K. (2010). *Extending students' learning spaces: Technology-supported seamless learning*. The 9th International Conference of the Learning Sciences (ICLS), Chicago.

Quiet Captures

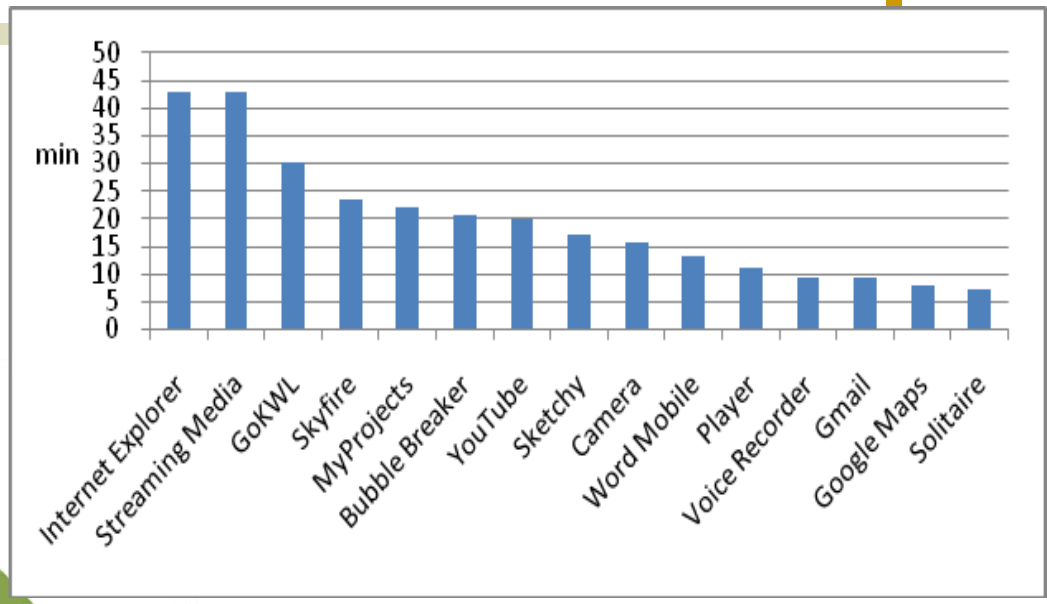
- Internally developed application to capture log file data & screen shots

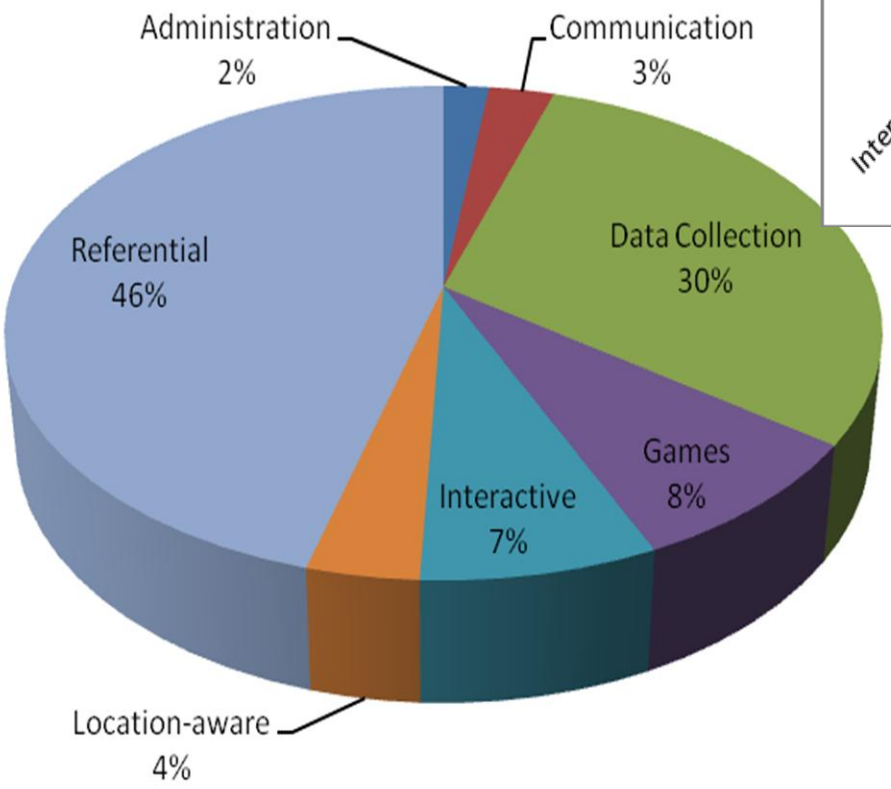




Ivica, B., & So, H. J. (2010). Quiet captures: *A tool for capturing the evidence of seamless learning with mobile devices*. The 9th International Conference of the Learning Sciences (ICLS), Chicago.

How did they use smartphones?





How did they use smartphones?

Application name/Time of the day	0	1	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Skyfire				279	1635	1699	1557	33	184	328	359	307		1466	73	474	995	2	2766	728	391	15	
Streaming Media	321					301	383	564	565	346	695	1019	345	774	898	557	634	349	374	414	1124	443	485
Internet Explorer	1924		510			352	141	568	328	650	548	367	301	294	373	373	221	350	235	123	358	198	1620
Youtube	281							442	5	1286	35	339	297	1378	984	674		436		5	2	116	688
Bubble Breaker						81		105	296	201	162	1936	261	205	507	660	934	693	147	238	212	45	
Sketchy								284	110	109	740		105	540	315	1265			2566	15		454	1
Google Maps	211							988		3	13			997		59		26		800	166	628	61
Camera							189	79	24	104	531	240	144	15	217	727	362	18		146	4	2	
Voice Recorder								107	4	3	131	118	5				531	656	823		196	41	
Player								92		33	117	122	17	17	419	419	142	214	157	186	625		
Solitaire								19	14		78				471	1204	71	106				91	
Gmail						101		148	237	279	292	59	83	313	68	73	72		56	21	80	21	12
GoKWL (GoKnow)									5	699	1189					16							
MyProjects								124	105	599	576	197		51	26	86			14	38	15	59	
Word Mobile								34	22	35	667	267			94	6					79	89	
Grand Total (s)	2737	0	510	279	1635	2534	2270	3587	1899	4675	6133	4971	1558	6050	4445	6593	3962	2850	7138	2714	3252	2202	2867

Understanding their media practices

- find out
  - students' areas of interests,
  - level of media literacy and usage patterns
- use appropriate tools
  - for curricular activities
  - to scaffold the students in class

an example of how informal learning can inform formal learning

- Student A learned to use Google Maps and taught his peers informally in class
- The teacher designed a Mathematics lesson that required students to use Google Maps to find out more about distance

Informal Learning Spaces

- 6 rounds of home visits
- Interviews with students, parents and siblings (for some participants)
- Strong parental support
- Limited space for informal learning for Singapore kids



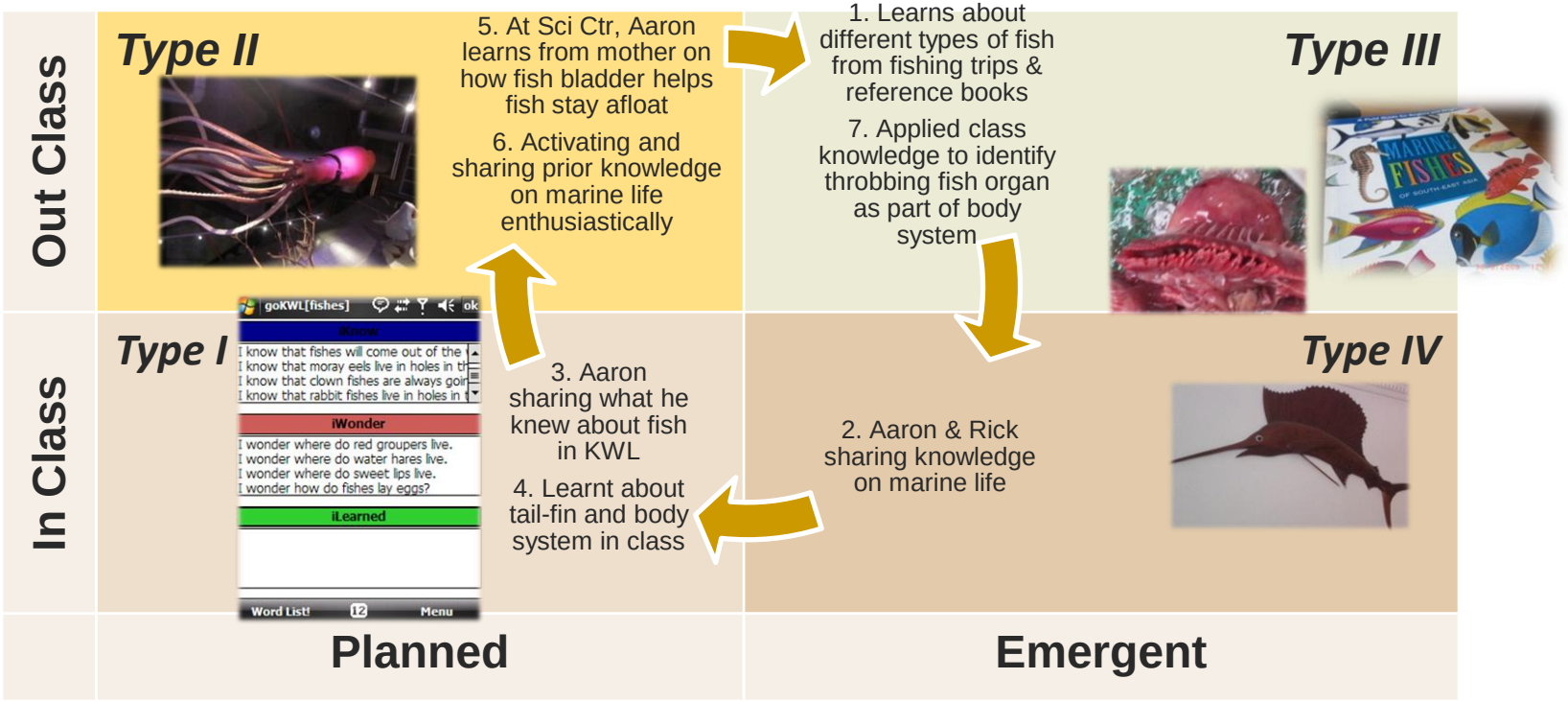

Linkages between formal and informal learning

One student - Aaron

Linkages between formal and informal learning

Research Findings

Learning experiences are deepened when a virtuous cycle is created, where the students can establish continuity of experiences connecting both the formal and informal learning spaces.



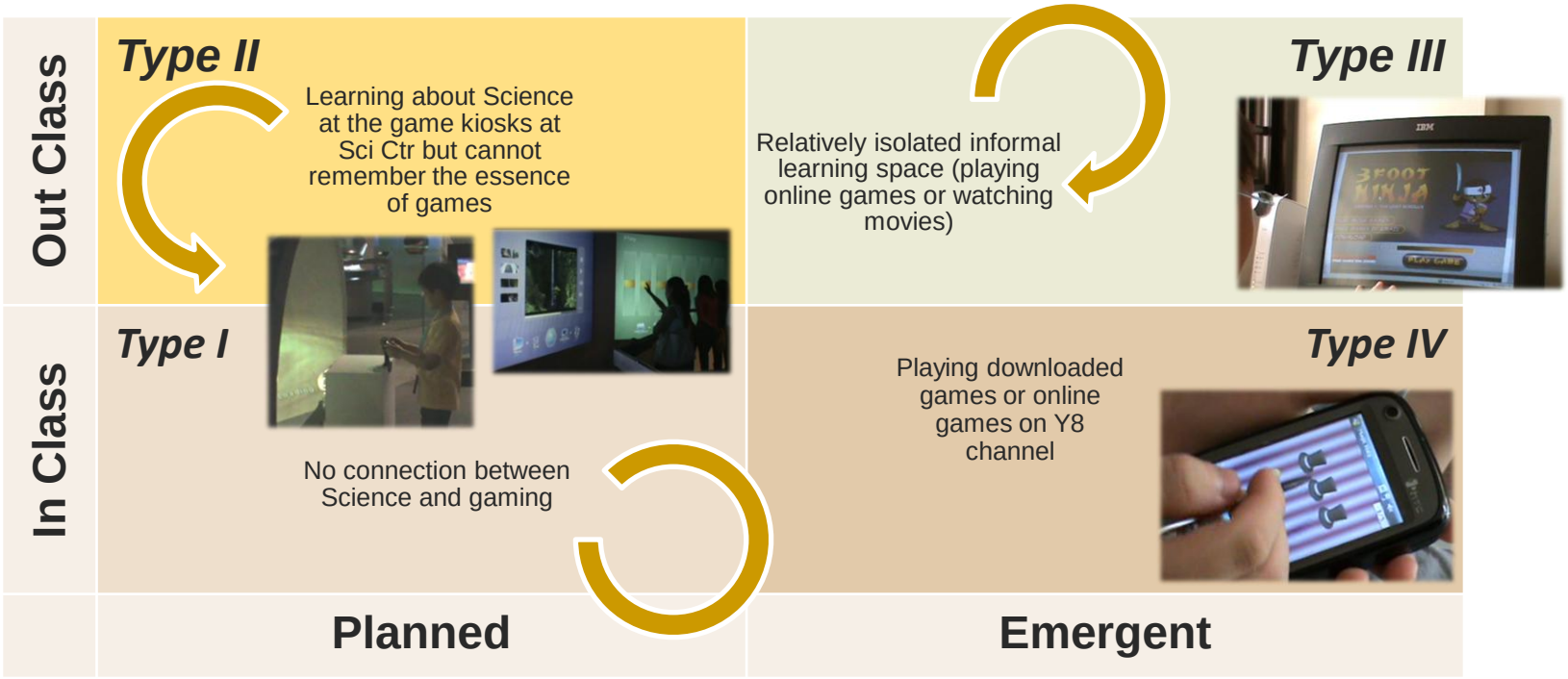
Aaron's example

Another student - Larry

Linkages between formal and informal learning

Research Findings

In cases where there are disjuncture in the cycle, learning tends to be more surface and perceived as irrelevant to the lives of participants.



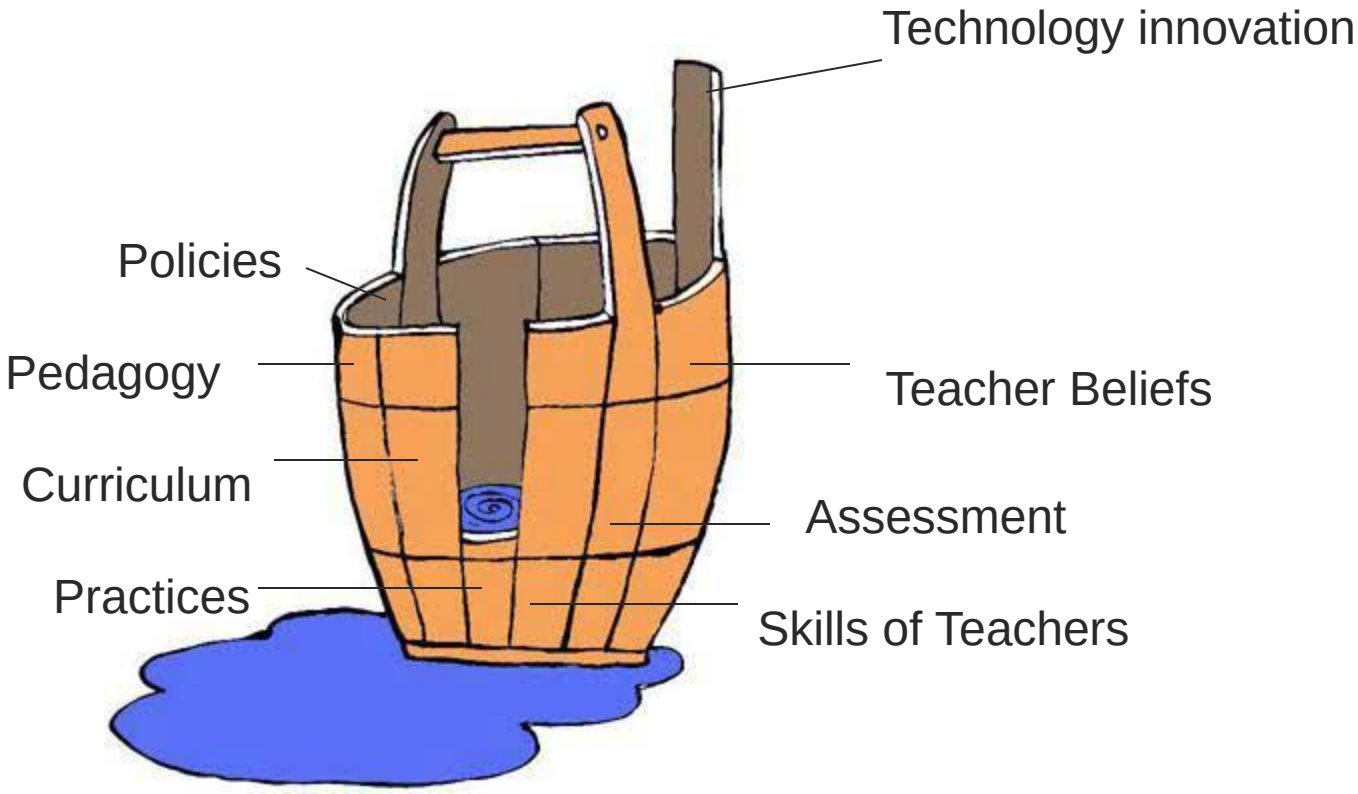
Larry's example

How to bridge

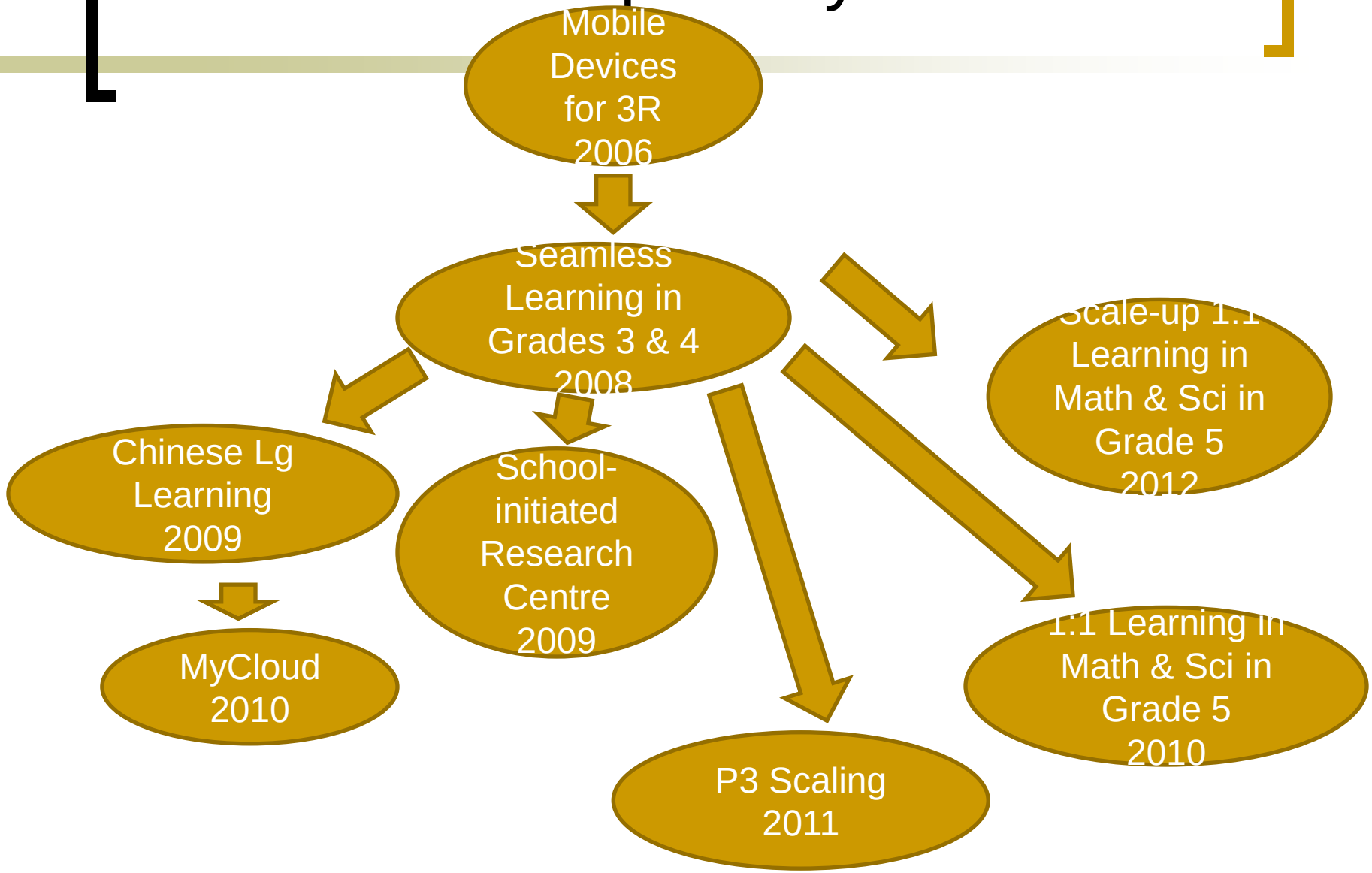
- Learning experiences are deepened when **a virtuous cycle** is created, where the students can establish **continuity of experiences** connecting both the formal and informal learning spaces.

Messages for sustainability

Barrel Theory 木桶原理



A long-term perspective to doing research at the primary school



From a systemic reform perspective

- Macro-level actors: Policymakers who set the climate or policies for educational reforms
- **Meso-level actors: Researchers as re- contextualizers who moved discourse from original to pedagogic site**
- Micro-level actors: Individuals such as students and teachers Looi, So, Toh & Chen, 2011

A richer analysis: 10 Dimensions of Seamless Learning (Wong & Looi, 2011)

(1) Encompassing formal and informal learning;

(2) Encompassing personalised and social learning;

(3) Across time;

(4) Across locations;

(5) Ubiquitous knowledge access

(6) Encompassing physical and digital worlds;

(7) Combined use of multiple device types

(8) Switching between multiple learning tasks

(9) Knowledge synthesis

(10) Encompassing multiple pedagogical or learning activity models.

Studying Seamless Learning

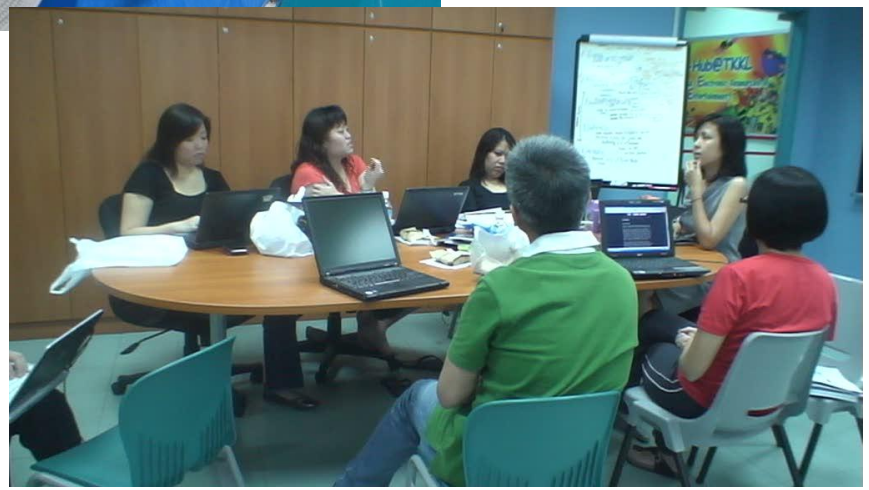
- Is SL a habit of mind? A potential pedagogical strategy?
- Must SL be mediated by mobile or ubiquitous devices?
- Need more ethnographic studies of seamless learning

Design principles from Facilitated SL to Self-Directed SL (Wong & Looi, 2011)

- develop learning activities that aim to change mindsets of students
  - more open-ended learning activities out of their personal curiosity and learning interests
- consider student artifacts created with the mobile devices as a means of formative assessment
- recognize that parents and other family members can be powerful resources to support students' seamless learning experiences

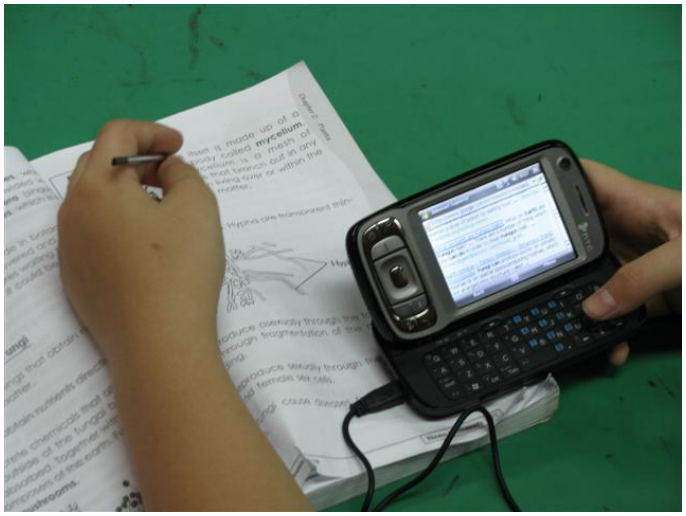
Strategies for adoptability

- Plan for routine use
- Plan for linkages with informal use
- Link to curricular activity system
- Empower teachers to continue design and enactment



Situations where technology works

- where students use technology all the time
- where technology is truly personal
- where the curriculum leverages the affordances of technologies
- where it is easy for teachers or students to add to the repertoire of technology-enabled activities



Sustaining the change

- A change has occurred
- Transformation? That implies sustained change
- Our challenge: Think through how the work can be continued to be sustained?

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The End

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