Science Education and Mobile Technologies: A Very Happy Marriage

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Intergalactic Mobile Learning Center
ISTE’s SIGML Grand Poobah & Chair
Have we got a deal for you!!!!!!!

Big Change: Mobile Technology

Change in Education

Human & Tech Story @ Nan Chiau Primary

5 Benefits for Learning of Mobile

Our experience can help you
Mobile Tech Uptake

FASTEST EVER!!!
Defining characteristics:

1. **Connectedness**: All the time, everywhere
   
   (“Hyper-connectedness” Thomas Friedman)

2. **Affordable**: By everyone

3. **Global**: Cross cultural—cross everything!
Post PC Era ➔ Age of Mobilism

Changing the way we live...

Isn’t talking .. Or walking, yet

Isn’t reading yet
A Mystery? NO!!!

Changing the way we teach?

- What’s Different about K-12???
- Why Hasn’t New Tech Changed Everything?
Other industries changed...

New Tech + Old Process = Incremental Change
Informate vs Automate

New Tech + NEW Process = DISRUPTIVE Change

LEAN MANUFACTURING AT DELL

In 1993 it followed a new process

Took HUGE Effort...
Shhhhh!!
But Schools Still Lagging

Old Pedagogy
But Schools Still Lagging

Old Pedagogy                     New Tech = 1:1
But Schools Still Lagging

NEW Pedagogy & Curriculum

New Tech = 1:1
Scaling is really hard…

Unrealistic Expectations

- Helicopter Tech In + PD = BINGO!!
- NO!!!! BANGO!!!!!
- Pilot Project Phenomena: False Expectations
- New Tech + 4 Teachers = GREAT STUFF
- New Tech + 40 Teachers = DISASTER
- WHY? Pilot HID Key Factors: Curriculum, Pedagogy
“They [teachers] give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking, ... learning naturally results.”  J. Dewey

Pedagogy of “Artisan Teachers”
Curriculum of “Artisan Teachers”

Artisan Teachers Make It Look Easy

- Hard for everyday teachers
- **Challenge:** support everyday teachers!
- **Challenge:** support admins, parents, etc
- **NOT** a challenge: support the kids
Studying change for 5+ years…

@ Nan Chiau Primary

Teachers, Students, Successful Pilot
The Human Side @ Nan Chiau Primary

Not so different from any other school...

<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Education</td>
<td>Masterplan 3: Inquiry Learning</td>
</tr>
<tr>
<td>Principal</td>
<td>Visionary, Leader</td>
</tr>
<tr>
<td>Initial Pilot Teacher</td>
<td>No Content Knowledge, No Classroom Skills, Respected Students' Ideas</td>
</tr>
<tr>
<td>Researchers</td>
<td>Developed Curriculum Modeled Pedagogy</td>
</tr>
<tr>
<td>Parents</td>
<td>Worried About Test Scores</td>
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</tbody>
</table>
“They [teachers] give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking, ... learning naturally results.” J. Dewey

**Mobile Technologies Enable:**
- Essential Use
- Ownership
Make it Easier to Enact LbyD: Students

Mobile Technologies: 5 Benefits

1. Cognitive: Direct and immediate access to information, events, locations, data
2. Learn in context
3. Discuss, collaborate, and work as a team
4. All the time, everywhere learning
5. Mobile devices are not just computers
Make it Easier to Enact LbyD: Students

Mobile Technologies: Smartphones Tablets

Essential Use

1. Cognitive: Direct and immediate access to information, events, locations, data
2. Learn in context
3. Discuss, collaborate, and work as a team
4. All the time, everywhere learning
5. Mobile devices are not just computers
Make it Easier to Enact LbyD: Students

Mobile Technologies: Smartphones Tablets

1. Cognitive: Direct and immediate access to information, events, locations, data
2. Learn in context
3. Social: Discuss, collaborate, and work as a team
4. All the time, everywhere learning
5. Mobile devices are not just computers
Make it Easier to Enact LbyD: Students

1. Direct and immediate access to information, events, locations, data
2. Learn in context
3. Discuss, collaborate, and work as a team
4. All the time, everywhere learning
5. Mobile devices are not just computers
Make it Easier to Enact LbyD: Students

Mobile Technologies: Participatory Sims

Energy Dashboard

<table>
<thead>
<tr>
<th>Student</th>
<th>Temperature</th>
<th>Humidity</th>
<th>Steps/min</th>
<th>Calories Burnt</th>
<th>Activity</th>
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<tbody>
<tr>
<td>John</td>
<td>89</td>
<td>79</td>
<td>26</td>
<td>456</td>
<td>Medium</td>
</tr>
<tr>
<td>Mary</td>
<td>77</td>
<td>65</td>
<td>16</td>
<td>655</td>
<td>Low</td>
</tr>
<tr>
<td>Alex</td>
<td>64</td>
<td>65</td>
<td>86</td>
<td>4537</td>
<td>High</td>
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<tr>
<td>Kevin</td>
<td>44</td>
<td>68</td>
<td>24</td>
<td>5367</td>
<td>Medium</td>
</tr>
<tr>
<td>nader</td>
<td>68</td>
<td>60</td>
<td>89</td>
<td>2146</td>
<td>High</td>
</tr>
<tr>
<td>Lu</td>
<td>67</td>
<td>44</td>
<td>72</td>
<td>3653</td>
<td>High</td>
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</tbody>
</table>

1. Learn in context
2. Direct and immediate access to information, events, locations, data
3. Discuss, collaborate, and work as a team
4. All the time, everywhere learning
5. Mobile devices are not just computers
Make it Easier to Enact LbyD: Students

Cooties: Participatory Sim
Make it Easier to Enact LbyD: Students

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Make it Easier to Enact LbyD: Students

Cooties: Participatory Sim
RECOVERING from a Successful Pilot !?!

Change at Nan Chaiu

- **Science**: 1 Teacher → 6 Teachers (350 3rd graders)
- **English**: 2 Teachers (120 3rd graders)
- Researchers + Curriculum Developers + HELP!
- IT’S WORKING – most of the time…
- Scaling UP:
  - Deep (Pedagogy First) vs. Shallow (Tech First)
Prediction: Take This to the BANK!!

Within $\frac{4}{3}$ years....
Every student, every grade, every school in US will be using mobile learning.

Change: NOT Easy, NOT Cheap, NOT Fast
Here’s the Deal!!!

We Can Help !!!

Intergalactic Mobile Learning Center
The University of Michigan and the University of North Texas

- **Windows Phone 7**: MyDesk (free)
- **Android**: Classroom-in-a-Box (at cost)
- **iOS**: Mini-Suite + Portal (free)

imlcresearchgroup@gmail.com
Here’s the Deal!!!

We Can Help !!!        MyDesk (Windows Phone 7)

my desk
my lessons                create
Water Cycle
Magnets
Vocabulary #4
Life Cycles
Angles
Democracy
Vocabulary #3

my creations           my feedback
Plant Drawing
Sketchbook
Bus Route
MapIt
ToDo List
NotePad
Voice Memo
Recorder

FREE
Here’s the Deal!!!

We Can Help !!!  Classroom-in-a-Box (Android)

1. 30 7” $100 Android Tablets
2. WeLearn Collaboration Platform
3. Curriculum
4. Professional Development
<table>
<thead>
<tr>
<th>Tablet</th>
<th>Manufacturer</th>
<th>Android Version</th>
<th>Price</th>
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<tbody>
<tr>
<td>Galaxy Tab</td>
<td>Samsung</td>
<td>2.2</td>
<td>$499</td>
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<tr>
<td>Google Nexus</td>
<td>Google</td>
<td>2.3.6</td>
<td>$149</td>
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<tr>
<td>Nook Tablet</td>
<td>B&amp;N</td>
<td>2.2</td>
<td>$99</td>
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<tr>
<td>eCafé Tablet</td>
<td>Idolian</td>
<td>2.3.3</td>
<td>$199</td>
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<tr>
<td>Visual Land Tablet</td>
<td>B&amp;N</td>
<td>4.0.1</td>
<td>$149</td>
</tr>
</tbody>
</table>

**Performance Metrics**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Galaxy Tab</th>
<th>Google Nexus</th>
<th>Nook Tablet</th>
<th>eCafé Tablet</th>
<th>Visual Land Tablet</th>
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</thead>
<tbody>
<tr>
<td>CPU Frequency</td>
<td>800</td>
<td>1000</td>
<td>1000</td>
<td>996</td>
<td>1008</td>
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<tr>
<td>Display</td>
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<td>480*800</td>
<td>600*1024</td>
<td>480*800</td>
<td>480*764</td>
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<tr>
<td>Density</td>
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<td>240 dpi</td>
<td>240 dpi</td>
<td>200 dpi</td>
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<tr>
<td>Memory</td>
<td>617</td>
<td>1001</td>
<td>1653</td>
<td>929</td>
<td>1500</td>
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<tr>
<td>I/O</td>
<td>564</td>
<td>630</td>
<td>961</td>
<td>615</td>
<td>3585</td>
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<tr>
<td>2D Accel</td>
<td>169</td>
<td>271</td>
<td>198</td>
<td>265</td>
<td>264</td>
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<tr>
<td>3D Accel</td>
<td>243</td>
<td>340</td>
<td>864</td>
<td>405</td>
<td>415</td>
</tr>
</tbody>
</table>

**Key Features**

- **Android 2.0 WIFI Tablet w/ microSD Slot**
- **Velocity Micro Slim 7" Touchscreen**
- **$59 for $154.99 Value**
- **Free Shipping**
Here’s the Deal!!!

We Can Help !!!

iOS (iPad, Touch, iPhone) FREE

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4. Professional Development
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- For SLIDES for All NSTA Powerpoints for strand:
- imlcresearchgroup@gmail.com