INTERNATIONAL SUMMIT ON ICT IN EDUCATION

EDUSUMMIT 2013

CALL to ACTION

Research-informed Strategies to address Educational Challenges in a Digitally Networked World

Overview

- What is EDUsummIT; How did it originate
- EDUsummIT 2013 discussion themes
- Examples from two themes
  - Advancing computational thinking in 21st century learning
  - Advancing mobile learning in formal and informal settings

Start – UNESCO, Paris, 2006

Leading questions of the Handbook

Aim

Synthesis of research on ICT in education from a broad international perspective

Target group

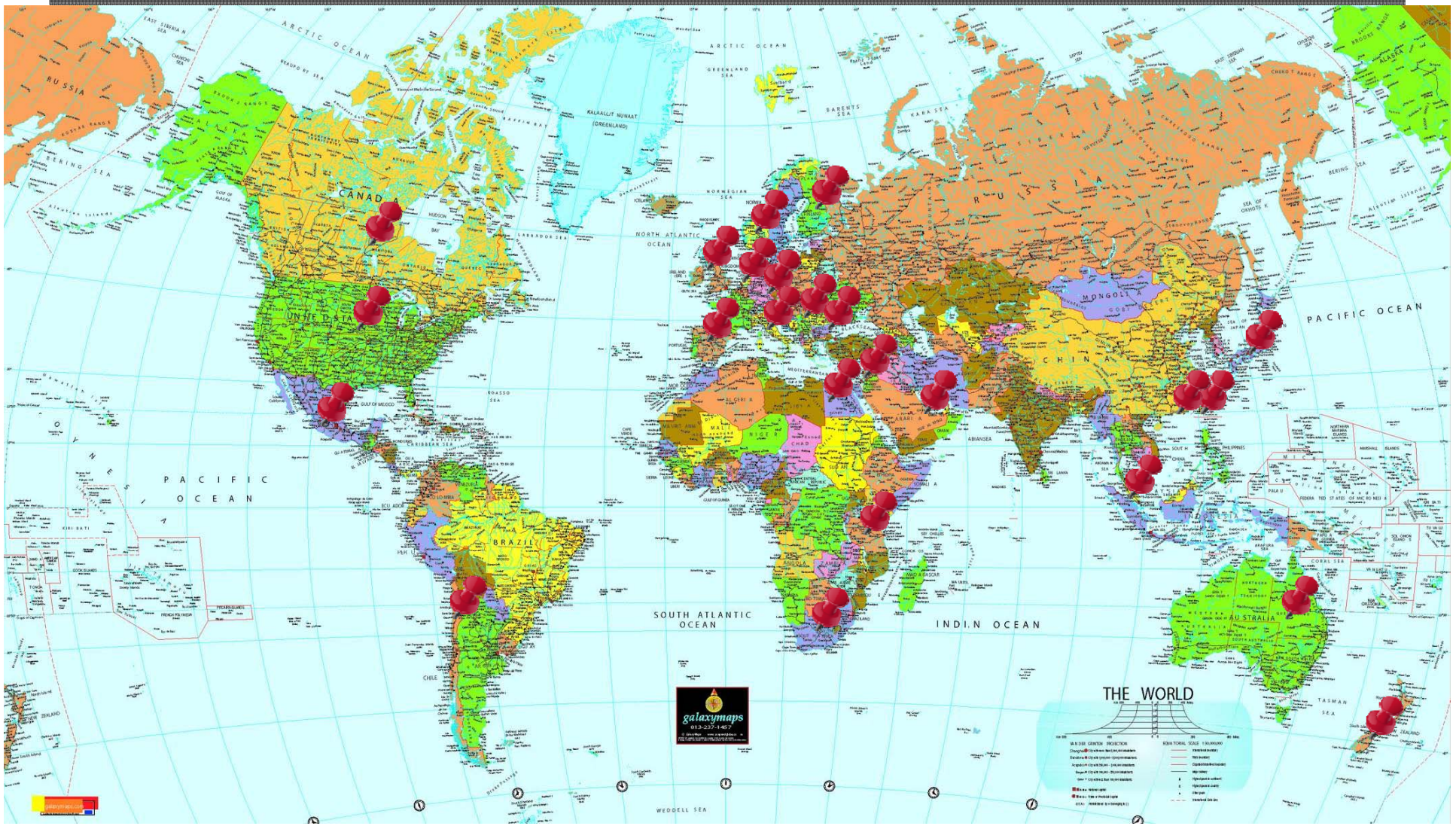
Researchers, policy makers and professionals

Who contributed

11 sections & 76 chapters

With the help of:

- 3 advisors from Japan, Brazil & the Netherlands
- 15 section editors
- 136 authors from 23 countries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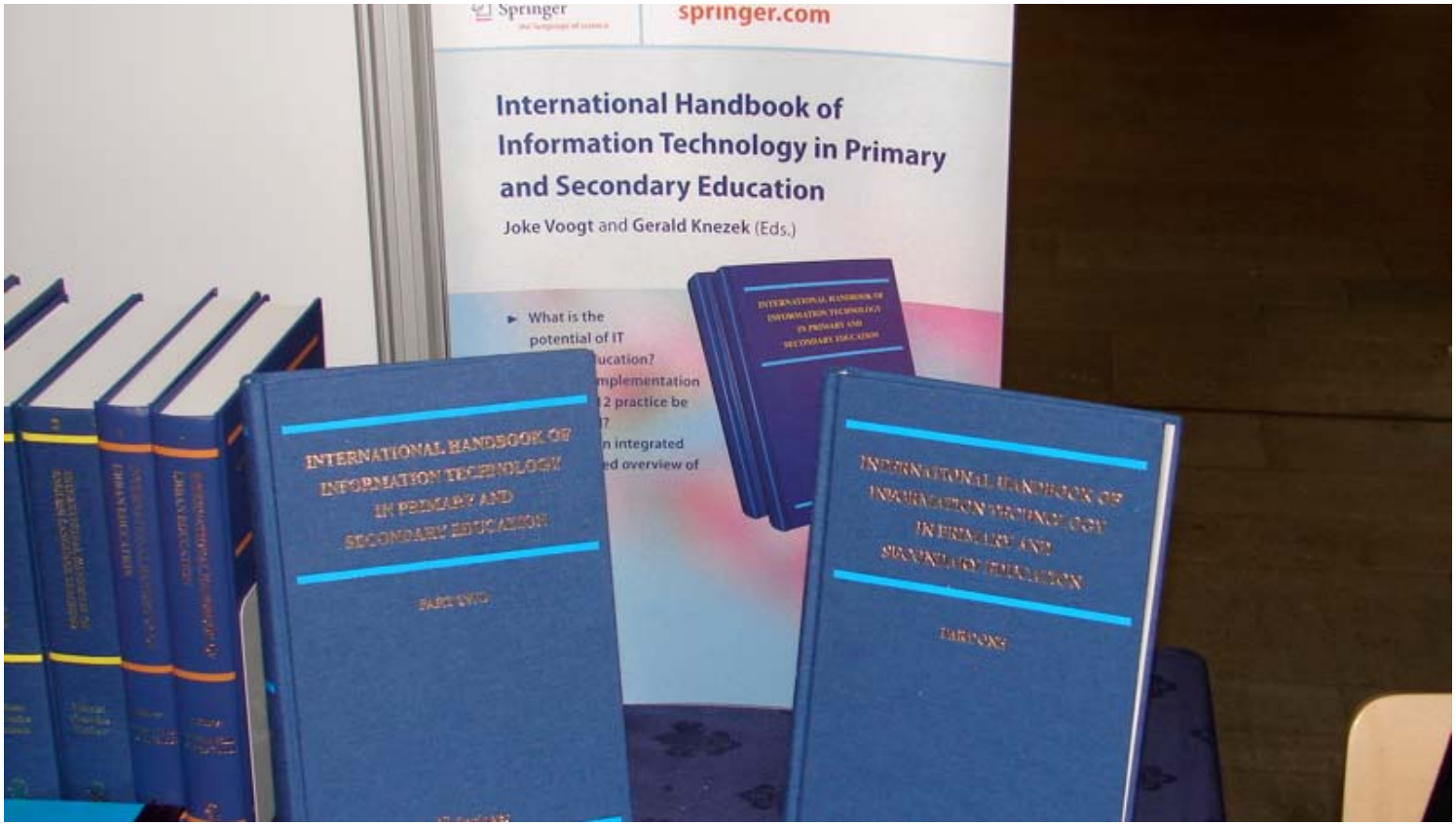
International Handbook of Information Technology in Primary & Secondary Education



Voogt & Knezek, 2008

What research has demonstrated

- ICT can enhance teaching and learning
- Under which conditions ICT works (at system, school and teacher level)

But

- ICT scarcely finds its way in teaching and learning practice

What is EDUsummIT

EduSummIT is a **global community** of policy-makers, researchers, and educators working together **to move education into the digital age**. The EDUsummIT community recognizes the need to respond to the challenges of a world **transformed by globalization and economic transformation**, caused to a large degree by the development of **digital networking technologies**.

The EDUsummIT seeks to engage educational leaders from across the world in conversations framed around issues and challenges facing education today and through that dialog, develop **action items that are based on research evidence.**

INTERNATIONAL SUMMIT ON ICT IN EDUCATION

EDUSUMMIT 2009

EDUsummIT 2009 The Hague:
Closing gaps between research policy and practice

INTERNATIONAL SUMMIT ON ICT IN EDUCATION

EDUSUMMIT 2011

EDUsummIT 2011, UNESCO Paris

Building a Global Community of Policy-makers, Researchers and Teachers

to Move Education Systems into the Digital Age

INTERNATIONAL SUMMIT ON ICT IN EDUCATION

EDUSUMMIT 2013

Research-informed Strategies to address Educational Challenges in a Digitally Networked World

Output

Pre- and post summit papers

Special issues

Conference papers

http://www.curtin.edu.au/edusummit/

Call to Action

Scholarly papers

Impact

in Denmark several new research initiatives were initiated

In the Netherlands national conversations about core values & characteristics of a future-oriented curiculum will start in 2015

'Guided US 2010 National Educational Technology Plan' (US)

"In our country a great emphasis has been given to ICT in education and an effort has been taken to prepare a Master Plan on ICT in education" (Bangladesh, policy sector)

EDUsummIT 2013 Working Groups

1. Towards new systems for schooling in the digital age
2. Advancing mobile learning in formal and informal settings
3. Professional development for policy-makers, school leaders & teachers
4. Digital equity and intercultural education
5. Assessment as, for and of 21st century learning
6. Advancing computational thinking in 21st century learning
7. Observatories for researching the impact of IT in education
8. Digital citizenship and literacies around the world

Action Agenda –issues across all 8 groups

- Identifying what works and what does not work
- Locating best practices to inspire research and practice
- Bridging formal and informal learning
- Developing new forms of technology-based assessments
- Encouraging collaboration within and between constituencies
- Using previously successful collaborative research strategies to foster the integration of IT into teaching and research
- Making research accessible to a broad range of constituencies

Advancing Computational Thinking in 21st Century Learning

- Follow up of EduSummIT2011 (Paris) 21st century learning

  Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of the 21st century. *Journal of Computer Assisted Learning, 29,*5, 403-413.

- Members TWG 6 EDUsummIT 2013

  Punya Mishra, USA, Joke Voogt, The Netherlands, Petra Fisser, The Netherlands, Chris Dede, USA, Gaber Cerle, Slovenia Miroslava Černochová, Czech Republic, Kinshuk, Canada, Sarah McPherson, USA, Richard Millwood, United Kingdom, Jon Price, Intel(USA), David Slykhuis, USA, Paolo Tosato, Italy, Tapio Varis, Finland

- Pre-and post summit papers

Dede, C., Mishra, P., & Voogt, J. Advancing computational thinking in the 21st Century, EDUsummIT 2013, Washington DC.

Mishra, P., Voogt, J., Fisser, P., & Dede, C. (2013). Advancing computational thinking in the 21st Century. Summary Report and Action Agenda. EDUsummIT 2013, Washington,

Action agenda TWG 6

- Develop a conceptual framework to define computational thinking and build a common vocabulary around it
- Develop measurable attributes to evaluate and assess computational thinking skills
- Identify research approaches and opportunities, with a particular focus on what aspects of computational thinking transfer to problem solving/ problem seeking approaches in other areas

Wing's Call for CT

- "Computational thinking involves solving problems, designing systems, and understanding human behavior, by drawing on the concepts fundamental to computer science… It represents a universally applicable attitude and skill set everyone, not just computer scientists, would be eager to learn and use"

ACM, 2006, p.33

What did we learn from Papert?

- "Mindstorms: Children, Computers, and Powerful Ideas" Seymour Papert, 1980)
  - Through thinking about programming, the students would become adept at thinking about thinking --------- transfer to non-programming contexts both within and outside of the classroom.
- Inconclusive results
- Low and high transfer
  - ***Low-road transfer*** encompassed skills that are practiced repeatedly, with the amount of transfer being dependent on the amount of repetition/ contexts in which it is practiced.
  - ***High-road transfer*** encompasses mindful abstraction of the concept or process being learned. High-road requires reflection on the knowledge and opportunities for transfer
- It is the instruction that counts

Features of CT

- Analyzing problems & artifacts
- Algorithmic approaches to problem solving
- Moving between different levels of abstraction & representation
- Familiarity with decomposition, emphasis on modularity
- Developing computational artifacts
- Understanding of data-structures and information structures
- Design thinking - how it is going to function
- Emphasis on debugging

Programming, Computer Science, and Computational Thinking are not equivalent constructs

The challenge of definitions of CT

- **Computational Thinking Practices**
- **P1: Connecting computing**
- **P2: Developing computational artifacts**
- **P3: Abstracting**
- **P4: Analyzing problems and artifacts**
- **P5: Communicating**
- **P6: Collaborating**

Example: A draft curriculum framework for CT

(Advanced Placement Computer Science Principles Draft Curriculum Framework, 2013)

The challenge of definitions of CT

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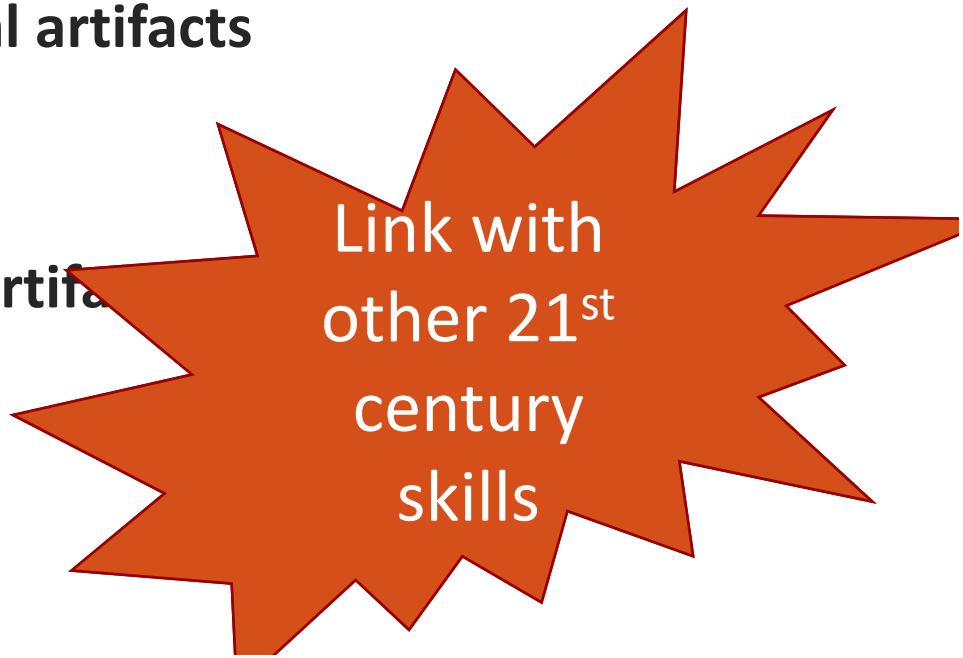

The challenge of definitions of CT

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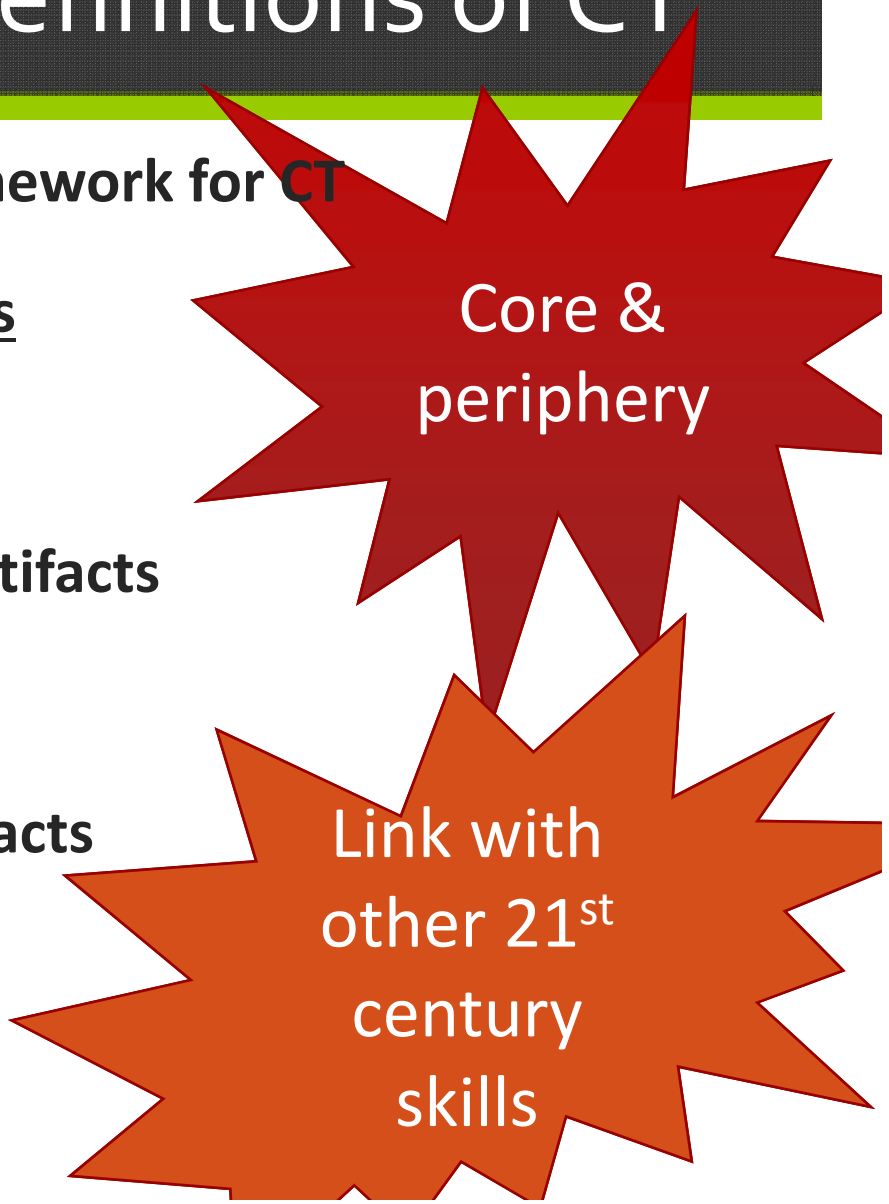

CT in educational settings

Separate Subject (England CS curriculum for 5-16 year olds)

At key stage 1 (5-7 year olds) students should be taught to:

- Understand **what algorithms** are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- **Create** and **debug** simple programs
- Use **logical reasoning** to predict the behaviour of simple programs
- Use technology purposefully **to create, organise, store, manipulate and retrieve** digital content
- Recognise **common uses** of information technology beyond school
- Use **technology safely and respectfully**, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

CT in educational settings

- **Separate subject**: Example: England
- **Cross curriculum settings**
  - **math** (e.g. learning multiplication, charting information, finding square roots)**, social studies** (understanding the assembly line), **language arts** (learning grammar)**, science inquiry and engineering, journalism**, **robotics** in kindergarten.
- **Informal learning settings**
  - learners informally engage in as **makers and creators** (including Scratch programming, DIY digital textiles, and robotics competitions)

Follow up from the EDUsummIT

- **Moving the actions forward**
- Article on Computational Thinking in Special Issue of Education and Information Technologies
- Invited chapter in the book *Competence-based Vocational and Professional Education* in the Springer series 'Education for the Changing World of Work'

INTERNATIONAL SUMMIT ON ICT IN EDUCATION

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Thematic Working Group 2 TW2

Advancing Mobile Learning in Formal and Informal Settings

Presenters: Ferial Khaddage, *Deakin University, Australia*
Gerald Knezek, *University of North Texas, USA*

TW2 Participants

- Rowland Baker (Rapporteur)
- Bram Bruggeman
- Rhonda Christensen
- Gerard Dummer
- Cathie Norris (Rapporteur)
- Barry Quinn
- Elliot Soloway (Rapporteur)
- Nicos Valanides
- Melissa van Amerongen
- Rivja Wadmany
- Paula White
- Participants who joined the group:
- Jorg Drager
- Participants on the list ultimately did not join:
- Joop van Schie

History

> EduSummit 2009 Action Item 1

> To establish a clear view on the role of ICT in 21st Century learning and its implications for formal and informal learning

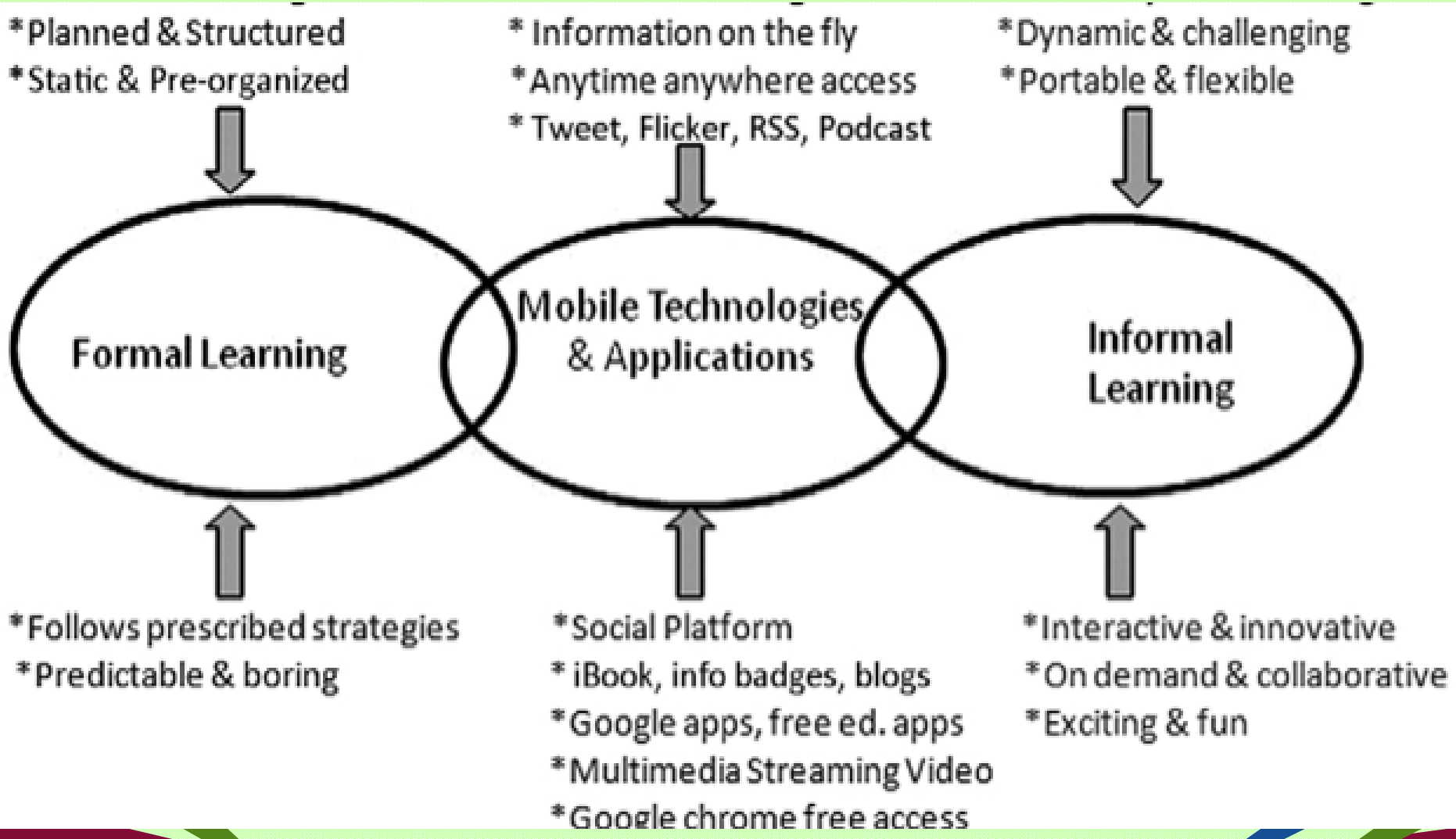
> JCAL 2010

Findings from EduSummit 2011

> “The emergence of mobile devices with ubiquitous network access has spurred interest in mobile and informal learning as alternatives to traditional formal training.”

> EduSummit 2011 Final Report to UNESCO

Mobile-Blended Collaborative Learning Model (MBCL)



EduSummIT 2013

> **Advancing Mobile Learning in Formal and Informal Setting**

Thematic Working Groups

TWG1: Smart Partnerships

TWG2: Advancing mobile learning in formal and informal settings

TWG3: Professional development for policy-makers, school leaders and teachers

TWG4: Addressing Gaps and Promoting Educational Equity

TWG5: Assessment as, for and of learning in the 21st century

TWG6: Creativity in a Technology Enhanced Quality curriculum

TWG7: Indicators of Quality Technology-enhanced Teaching and Learning

TWG8: Digital Citizenship and Cyberwellness

TWG9: Curriculum - Advancing understanding of the roles of CS/Informatics in the Curriculum

Bridging Formal and Informal Learning

- **EduSummit 2013 Position Paper:**
- **Blending student technology experiences in formal and informal learning: Implications for Innovation in Policy and Practice**
- Kwok-Wing Lai, *University of Otago, New Zealand*
- Ferial Khaddage, *Deakin University Melbourne, Australia,*
- Gerald Knezek, *University of North Texas, USA*

A Model Driven Framework to Address Challenges in a Mobile Learning

Ferial Khaddage, Wing Lai, Gerald Knezek, Rhonda Christensen, Cathie Norris, Elliot Soloway,

- We are moving, headlong, into the Age of Mobilism (Norris & Soloway, 2011).
- It has been estimated that the number of mobile subscriptions would reach the seven billion mark in 2013, which would be greater than the number of humans on the planet (Faille & Morrison, 2013).
- The growth rates of mobile phone subscriptions in less economically advanced countries were the fastest (Ally, 2013)

Bridging Formal and Informal Learning

Recommendations for action have common themes that acknowledge the need for:

- **Identifying what works** and what does not work pertaining to the integration of IT in education
- **Locating best practices** within each thematic working group area to inspire research and practice
- **Bridging formal and informal learning**
- **Making research accessible** to a broad range of constituencies

Recommendations for Action: TWG2

1. **Develop criteria for identifying best practices and models of mobile learning** which are evidence-based, culturally sensitive, curriculum centered, flexible and scalable.

Recommendations for Action: TWG2

2. **Develop guidelines and strategies to tackle challenges of mobile learning**, including BYOD, interface design, cross platform applications, assessment, equity, cultural, health and safety issues, teacher preparation issues, and quality of learning outcomes in order to bridge learning across settings and contexts.

Action Plan

1. Criteria to be developed for identifying *best practices* and *models* of mobile learning:
   - ✓ evidence-based,
   - ✓ culturally sensitive,
   - ✓ curriculum centered,
   - ✓ Flexible and scalable,
   - ✓ allow pedagogical changes and student directed learning,
   - ✓ applicable in formal and informal contexts.

Action Plan *(cont.)*

2. Guidelines and strategies be developed to tackle challenges of mobile learning:

- ✓ BYOD,
- ✓ Interface design,
- ✓ Crossptaform problem applications,
- ✓ Assessments, equity, cultural, health and safety issues,
- ✓ Teacher preparation, quality of learning outcomes
- ✓ Bridging learning across settings and contexts.

Challenges Identified by TWG2

- ✓ Some schools not allowing students to use mobile devices.
- ✓ Policies on students bringing their own devices
- ✓ Students not using mobile devices for intentional learning purposes
- ✓ The need to change assessment practices
- ✓ Equity issues in accessing mobile devices
- ✓ Cultural issues in using mobile devices in different contexts
- ✓ Cross platform issues in mobile applications
- ✓ Design challenges, e.g., size of screen
- ✓ Health and safety issues

Policy, Research & Practice Implications

- Unresolved Issues

1. **Shared understanding** of mobile learning: What makes mobile learning unique?
2. **Design and pedagogical issues**: Do we know what learning and pedagogical theories/strategies work best with mobile learning?
3. **Mobile literacy skills**: What skills are needed for learners to participate successfully in mobile learning?

Policy, Research & Practice Implications

- Unresolved Issues

4. **Policy issues**: The need to develop **policy guidelines** for: equitable access, privacy, intellectual property, health and safety

5. **Evaluation**: Mobile learning is about **learner control**, situated and context-based. How can it best be evaluated, particularly in informal contexts.

6. **Platform Independence**: Ex: US DOD **S**harable **C**ontent **O**bject **R**eference **M**odel (**SCORM)**

Emerging Issue: Styles of Mobile Learning Implementation

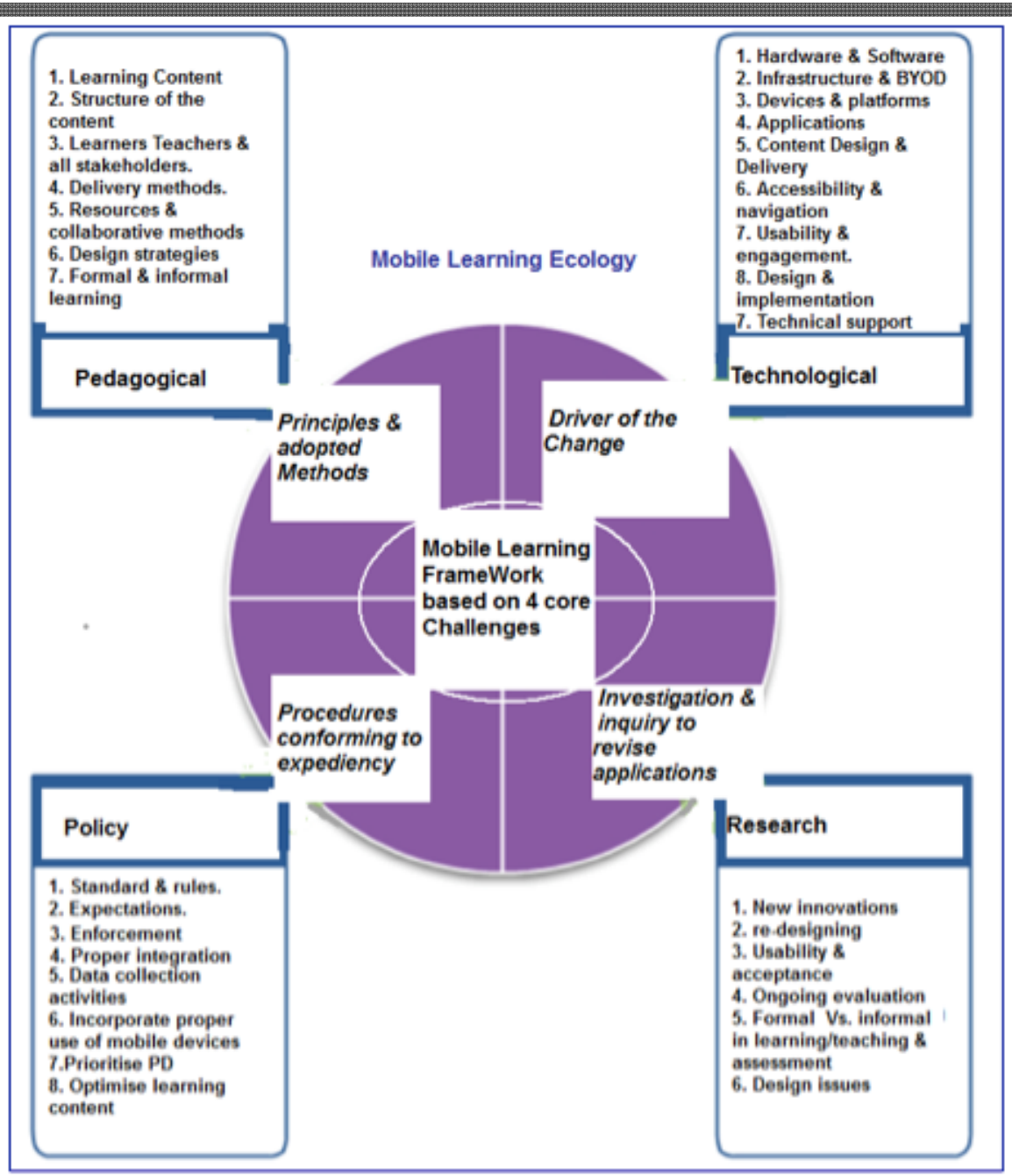
- **Problematic:** Decision makers at the school district or ministry top level arrange for mass distribution of devices.
- **Promising:** Parents and teachers foresee benefits, begin grass roots initiative, school conducts needs analysis and pilot test(s).
- **Preferable:** Ministry sets educational goal, conducts needs analysis and pilot test(s), refines and scales up.

The Case of Nan Chiau Primary School

Nan Chiau Primary School in Singapore, is part of the Qualcomm Wireless Reach WE Learn project.

Smartphone use for teaching and learning.

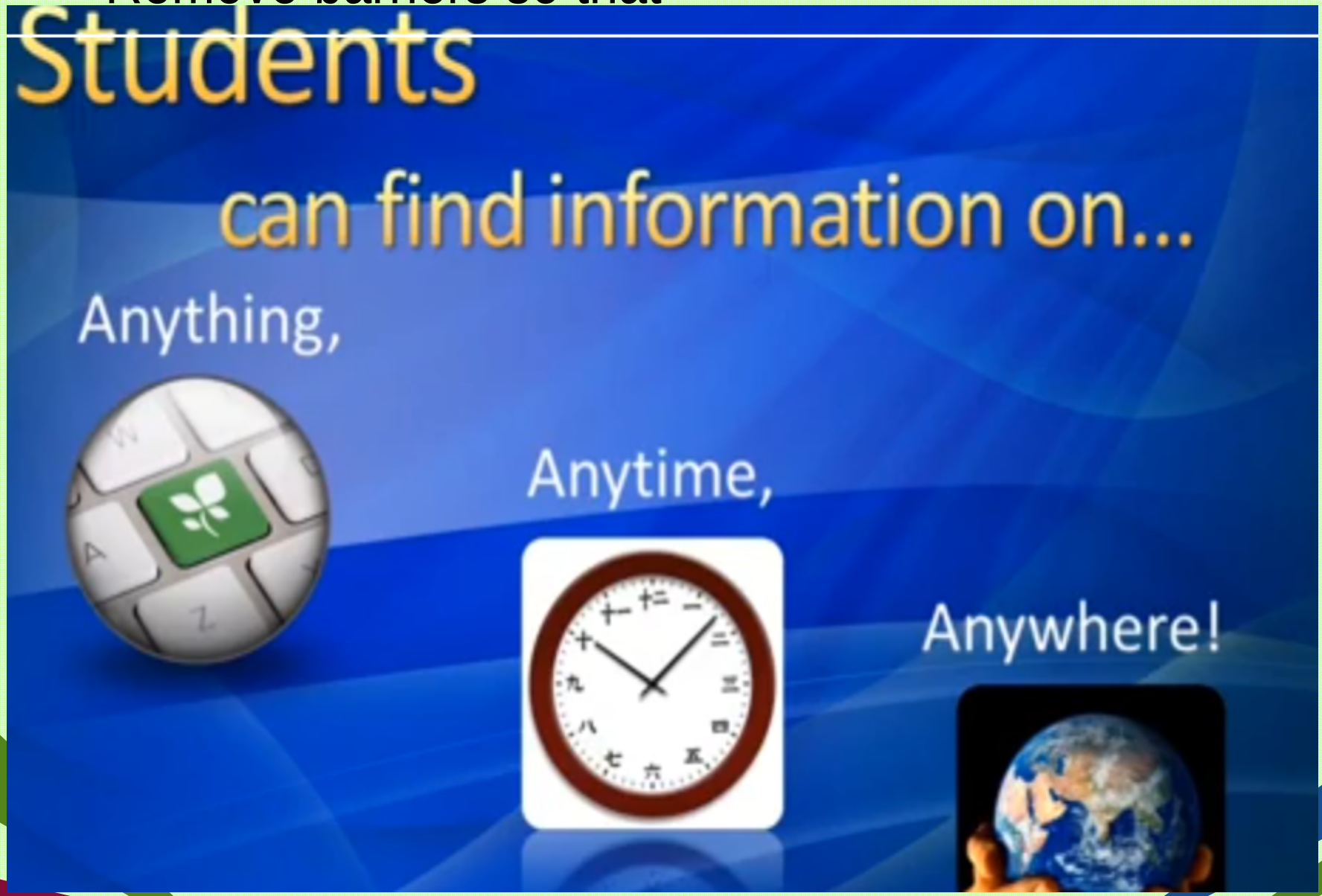
Students are Excited to Share and Learn


Mobile Learning Ecology
1. Learning Content
2. Structure of the content
3. Learners Teachers & all stakeholders.
4. Delivery methods.
5. Resources & collaborative methods
6. Design strategies
7. Formal & informal learning
Pedagogical
1. Hardware & Software
2. Infrastructure & BYOD
3. Devices & platforms
4. Applications
5. Content Design & Delivery
6. Accessibility & navigation
7. Usability & engagement.
8. Design & implementation
7. Technical support
Technological
Principles & adopted Methods
Driver of the Change
Mobile Learning FrameWork based on 4 core Challenges
Procedures conforming to expediency
Investigation & inquiry to revise applications
Policy
1. Standard & rules.
2. Expectations.
3. Enforcement
4. Proper integration
5. Data collection activities
6. Incorporate proper use of mobile devices
7.Prioritise PD
8. Optimise learning content
Research
1. New innovations
2. re-designing
3. Usability & acceptance
4. Ongoing evaluation
5. Formal Vs. informal in learning/teaching & assessment
6. Design issues

Prominent Issues and Opportunities

- **Sharp distinction** perceived between formal and informal learning
- **Tension** between traditional classroom learning and open access to knowledge
- **Tension** between the personalised nature of mobile technology and the collaborative/community aspect of learning with mobile technologies
- **Identifying barriers that inhibit bridging** formal and informal learning through mobile technologies is a first step toward resolving the current sharp distinctions

Remove barriers so that



Advancing Mobile Learning in Formal and Informal Settings

Mobile is changing *how* we interact with the world, ……

Thank you !

EDUsummIT2015

- In the **Asian Pacific Region**
- **September 14 & 15** in **Bangkok Thailand**
- Chaired by **David Gibson** (Australia) & **Kwok Wing Lai** (New Zealand)
- In close collaboration with **UNESCO Bangkok office**

EDUsummIT2015

TECHNOLOGY ENHANCED QUALITY LEARNING FOR ALL

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- http://www.curtin.edu.au/edusummit/

- Joke Voogt j.m.voogt@uva.nl
- Gerald Knezek gknezek@gmail.com