Technology Enhanced Learning

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Why Technology Enhanced Learning?
Education

- Industrialized
- Build for Scalability
- Suited for the creation of “comparable” people
Is this kind of education appropriate for the social knowledge age?
Highly dynamic global markets
Highly connected market players
Managing complexity
Mass customization
Open innovation and virtual organizations
Skills?

Creativity
Flexibility
Ability to reflect
Ability to learn (life-long!)
How can education meet these skills?

- When students are grouped by age, not by abilities or interests?
- When all students receive the same learning materials?
# What is Technology Enhanced Learning
Enhanced

Learning Technologies

- Communities
- Personalisation
- Metadata
- Cloud Computing
- Digiboards
- Social Networks
- Learning Analytics
- Augmented Reality
- Mobile Applications
- Serious Games
- ...

Enhanced

- Reading
- Listening
- Teaching
- Assessment
- Reflection
- Feedback
- Behavior Change
- Motivation
- Curiosity

better processes
more acceptable
more effective
more efficient
Communities
Personalisation
Metadata
Cloud Computing
Digiboards
Social Networks
Learning Analytics
Augmented Reality
Mobile Applications
Serious Games

Learning Technologies

Enhanced

Learning

Reading
Listening
Teaching
Assessment
Reflection
Feedback
Behavior Change
Motivation
Curiosity

more efficient
more effective
more acceptable
better processes
ICT Enhancements

- **Storage**: Big Data
- **Connectivity**: Social Network, MOOC
- **Computational Power**: Simulations, Games, Real Time Applications
- **Context-Awareness**: Sensors, Displays, Augmented Reality, Tangibles
VISIBLE LEARNING
A SYNTHESIS OF OVER 800 META-ANALYSES RELATING TO ACHIEVEMENT

John Hattie

Routledge
VISIBLE LEARNING: A SYNTHESIS OF 800 META-ANALYSES RELATING TO TEACHING EFFECTS

TELEVISION $d = -0.18$

**KEY**
- Standard error: na
- Rank: 137th
- Number of meta-analyses: 3
- Number of studies: 37
- Number of effects: 540
- Number of people (1): 1,022,000
VISIBLE LITERACY: A SYNTHESIS OF 800 META-ANALYSES RELATING TO EBOOKS

TELEVISION $d = -0.18$

Interactive video methods $d = 0.52$

KEY
- Standard error
- Rank
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- Number of people

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Table 10.8 Summary of major uses of computers in classrooms

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#2 Current Trends
computer became ubiquitous and adapt to their environment
body network sensors, rooms intelligent carpets, wall colour, or gesture tracking, building, architects already create completely new facades for buildings, public places and city planning new artefacts will enable dynamic routing and highlighting of space
Each year 1.2 billion new phones, Information can be accessed not only in city centres but much more important in rural areas, information will grow even more rapidly, mobile devices become more context-aware, new user interfaces
“mobiles as universal tools for reading, discussion, documentation, annotation, and others learning activities.”

650,000 apps and growing.
Sensor Technology can record data in a scalable way.

http://quantifiedself.com/
Cloud Technology can support seamless learning trajectories.

Display Technology can support awareness and reflection.

Augmented Reality can augment your perception of a context...

http://www.designbynotion.com/metamirror-next-generation-tv/
#3 CELSTEC Research
#3a
Ubiquitous Content for Collaboration and Discourse
#1 federate #access any...
MACE | EVERYVILLE
interactive installation at the Venice Biennale '08

#1 federate #access any...
Reflection in and about Context
mobile RA

experience sampling and mobile data collection

Figure 8.2. Student reflective questions: a. What were your main learning channels today? b. What was your learning day? Rate it from 1 to 5.
• Augmented Reality Games,
• Excursions,
• Mixed Reality Games,
• Mobile Games and Simulations.

Authoring Mobile Apps

StreetView

[Images of AR applications and platforms]
#3c
Orchestration of Ubiquitous Support
Sensor Infrastructure, Power, Tags (NFC, QR), Location, MC Questions
Sensor Infrastructure, Power, Tags (NFC, QR), Location, MC Questions
Ambient and Situated Displays
Experiment 2

Ambient and Situated Displays
Gamification and Social Incentives

Figure 9. Sample badges for sharing personal experience (a) and for collecting information about the game and the technologies used to play it (b)

Figure 10. Sample badge in three different states: (a) bronze, (b) silver, and (c) gold
Summary

• Technology becomes more and more integrated in daily environments, ubiquitous, social and immersive.

• Ask yourself what your targeted effect and your problem to be solved by TEC is.

• Mobile devices, Embedded Systems, and Sensors can create feedback loops and reflection triggers for in-situ and authentic learning.
What next?

- **Continuation**: Scaling technology delivers new service qualities
- **Societal changes**: new work styles require new educational styles
- **Upcoming technologies**: Self driving cars might change society more than we imagine now
Thank You!

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