

Ubiquitous Computing: More Than Just Handhelds

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Some Context: Societal Changes Caused by Technology

- Wireless, portable, mobile, and multiple units connected in what has been dubbed a “**device ecology**” (Wentzel, 2003).
- **Context-aware computing**: who, what, when, where, why; location-aware devices (Abowd & Mynatt, 2000).
- Users are **active, creative, and communicative**, not passive receivers of information (Alexander, 2004).
- **New social practices** such as blogging, personal area networks, flash mobs, and smart mobs (Roush, 2005).
- **Technology is everywhere**, and can be used anytime by everyone (ATMs, scanners, cell phones, handhelds, gaming devices, iPods, cars, kitchens).....it's **ubiquitous**.


What Is Ubiquitous Computing?

- **Ubiquitous**: existing or being everywhere at the same time : constantly encountered : **WIDESPREAD, OMNIPRESENT**
 - Source: Merriam-Webster Online Dictionary
 - Source: *WordNet @ 2.0, © 2003 Princeton University*
- **Ubiquitous computing**: Computers **everywhere**. Making **many computers** available throughout the physical environment, while making them **effectively invisible** to the user. Ubiquitous computing is held by some to be the Third Wave of computing. The First Wave was many people per computer, the Second Wave was one person per computer. The Third Wave will be **many computers per person**. Three key technical issues are: power consumption, user interface, and wireless connectivity.
- http://en.wikipedia.org/wiki/Ubiquitous_computing

Why Talk About Ubiquitous Computing When This Is Really About Handheld Computers?

- **Mobile devices are a key component of the overall technology infrastructure in our society**:
 - Access anytime, anywhere, by anybody.
 - They are the glue that hold the other pieces together.
 - Variety in devices and uses (communication, multimedia, productivity); many-to-many.
 - So...when using handheld devices we shouldn't think about them in isolation.
- **This is especially the case for the kids we teach today**:
 - cell phones, portable games, multimedia devices like iPods, instant messaging...
 - Kids don't know an environment without mobile technology, it was there when they were born.
- **However, technology is NOT the focus, it's what we do with it.**


What Do Some Experts in Education Say?



What Does It Look Like?

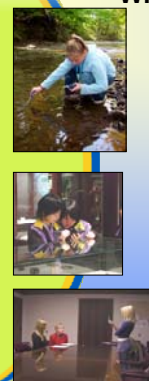


Another Example



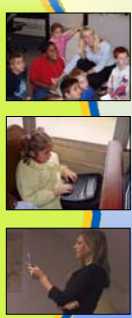
MyArtSpace

What Does Mobile Technology Mean for the *Learning Environment*?



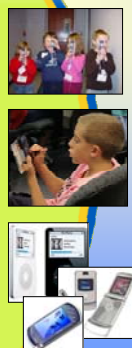
- Expand learning beyond the classroom, both from the inside out and the outside in ([MyArtSpace](#) & [movie](#)).
- Different experiences, virtual or real (simulations and gaming, e.g. Ambient Wood, GIPSY, [Frequency 1550](#), [Environmental Detectives](#)).

What Does Mobile Technology Mean for *Teaching*?



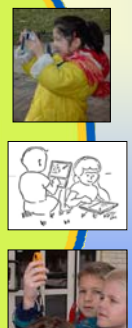
- Rethinking pedagogy: More student-centered, constructivist, flexible, project-oriented.
- Rethinking boundaries (space and time)
- Rethinking curriculum: up to date content, assessment, tools for learning.
- More student communication of concepts learned.
- Learning represented in a variety of ways (text, visual, multimedia...)

What Does Mobile Technology Mean for *Learning*?




- Rethinking engagement and motivation
 - Increased writing skills.
 - Some improvement on proficiency tests.
- Rethinking individualization
- Rethinking collaboration
- Rethinking learning for all
 - Increased access and media literacy.
 - Leveling of the playing field for low-performing and special needs students.

What Does Mobile Technology Mean for *Students*?



- Improved motivation, engagement, attendance, behavior.
- Better organization.
- More independence.
- Seamless transfer of technology skills between world and school.

What Does Mobile Technology Mean for *Interactions*?




- Students become experts.
- More collaboration st-st and t-st.
- Deeper and more complex interactions around learning.

What Are Some Potential Obstacles?

- Funding
- Compatibility of devices
- Privacy, safety, and security
- Administrative support
- Technical support
- Professional development
- Redesigning curriculum

Why Should Education Embrace This Type of Technology Use?



- Take advantage of what students already own and know how to use.
- Students do need guidance on how to use digital tools in productive, safe, and responsible ways.
- Result: Access = Impact!!!

Education  World

Mobile/Ubiquitous Computing

RCET's Ubiquitous Computing Project

- AT&T Classroom
- Ubiquitous Computing DVD
 - [Website](#)
 - [Discussion forum](#)
- Ubiquitous Computing book



- If time show more video examples:
 - Freq 1550 (cell phones)
 - Taiwan (various devices)
 - Authentic science (Danas, Writing Pad)
 - Collaboration (handhelds)

References

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