

Enhancing Children's Literacy through Technology

Yimei Lin
National Chung Cheng University
Chia Yi, Taiwan

Mark van 't Hooft & Karen Swan
Kent State University
Research Center for Educational Technology

Annual Conference of the American Educational Research Association
April 2007, Chicago, IL



Introduction

- We live in a “post-typographic” world (Reinking, 1998): digital media are replacing printed text;
- Therefore, a successful 21st-century worker should have digital literacy skills:
 - Language proficiency (e.g., reading, writing)
 - Problem solving skills
 - Information/technology literacy skills (e.g. locating and evaluating info)



Are We There Yet?

- National Center for Educational Statistics (2005):
 - 93% of K-12 classrooms have Internet access.
 - The ratio of students to computers w/Internet= 4.4:1.
- But:
 - Less than 10% of teachers use ICT to access research and best practices.
 - Among those, only 23% felt well-prepared to integrate ICT into teaching.



Are We There Yet?

- Singapore (2002):
 - 30% of class time includes using ICT
 - The ratio of students to computers = 2:1
- Hong Kong (2003):
 - 25% of class activities includes using ICT
- Taiwan (2003):
 - All K-12 schools have Internet access
 - 20% of class activities includes using ICT



Integration of Literacy and ICT

Writing Process

Language Experience Approach



Students write down stories about personal experiences and share with the class. The teacher writes down what is said and reads it back to students until they associate writing with speaking.



Digital Language Experience Approach (D-LEA)

Using digital photographs and software as a LEA innovation.

1. Setting up the experience.
2. Photographing the experience.
3. Composing a multimedia story/photo essay.
4. Engaging in follow-up activities.



Learning Perspectives of D-LEA

- Social Theories of Learning
 - Learning is a result of social practices.
 - Vygotsky's ZPD identifies the essential role of interaction and collaboration.
- Mindtools
 - Learning **with** technology, not **from** technology.
 - Technology is an intellectual partner to help learners across the ZPD gap
 - ICT engages students in representing, manipulating, and reflecting on what they know.

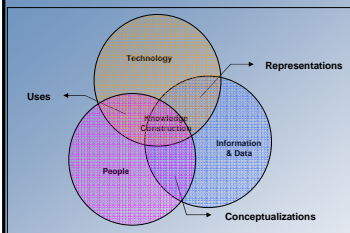


Learning Perspectives of D-LEA

- Cognitive Flexibility Theory
 - Meaningful understanding requires multi-dimensional skills and being able to restructure knowledge due to changing situational demands.
 - Students learn more when they develop competencies incrementally.
 - Pedagogical approaches include multiple representations, knowledge interconnectedness, knowledge assembly, active learning.



Learning Perspectives of D-LEA



Technology-Enriched Learning
 adapted from Swan et al.'s (2005) model of Interacting Affordances of Ubiquitous Computing

• **"representations"**: the artifacts people create to represent and illustrate what they know externally.

• **"conceptualizations"**: how information is represented, organized, processed, and manipulated in individuals' minds (i.e., learning).

• **"uses"**: the digital tools people utilize to represent what they know and conceptualize what they've learned through the use of technologies.



A Case Study

Research questions:

- How can D-LEA experiences be used in a technology-rich learning environment?
- What representations, conceptualizations, and uses are afforded by ready access to a variety of ICT that would not be possible otherwise?
- How does D-LEA affect student motivation and attitudes toward learning?



A Case Study

- Setting: AT&T Classroom (high-tech classroom/lab).
- Participants: 25 4th grade students (5 gifted, 1 IEP, 4 ADD).
- Data collection:
 - 6 weeks, 2 hours a day
 - Teacher/student/parent interviews, field notes, student work samples, teacher reflections, videotaped observations



Findings: Use of DLEA Activities

Setting up the experience	Students wrote a report about endangered animals; evaluated search engines and resources (ICT: Word, WWW, Inspiration)
Photographing the experience	Students produced animation-type videos with narration highlighting the facts about their animals (ICT: Word, WWW, Inspiration, Write:OutLoud, digital images and video)
Composing a multimedia story/photo essay	Students produced multimedia reports and published a collective book placed in the school's library (ICT: Word, WordArt, digital images)
Engaging in follow-up activities	Students worked together to produce a newscast of an endangered animal (ICT: WWW, Word, Write:OutLoud, mobile word processors, digital video, teleprompter)



Findings: Representations, Conceptualizations, Uses

D-LEA	Representations	Conceptualizations	Uses
Setting up the experience	Concept maps Text documents Graphics	Report about endangered animals	Inspiration Word WWW
Photographing the experience	Concept maps Text documents Graphics Digital images Digital video	Animation-type videos with narration about their animals	Word, WWW, Inspiration, Write:OutLoud, Digital images and video
Composing a multimedia story/photo essay	Text documents with images and graphics	Multimedia reports and a collective book (<i>ICT: Word, WordArt, digital images</i>)	Word, WordArt, Digital images
Engaging in follow-up activities	Digital video (including video, digital images, and text)	Collaborative newscast of an endangered animal	Word, WWW Write:OutLoud, Mobile devices, Digital video, Teleprompter

Findings: Motivation, Attitudes toward Learning

- Students were highly engaged in learning and motivated to produce better work.
- ICT provided technology-supported and authentic learning tasks.
- Students worked collaboratively, using higher-level skills to organize and communicate their thoughts.
- Students were less afraid to try, make mistakes, and fix them.



Conclusions

- ICT can and should support literacy education;
- Importance of an educational framework to support use of ICT for learning;
- Importance of the teacher when using ICT for learning;
 - More complex information environment;
 - Need for increased literacy skills

