

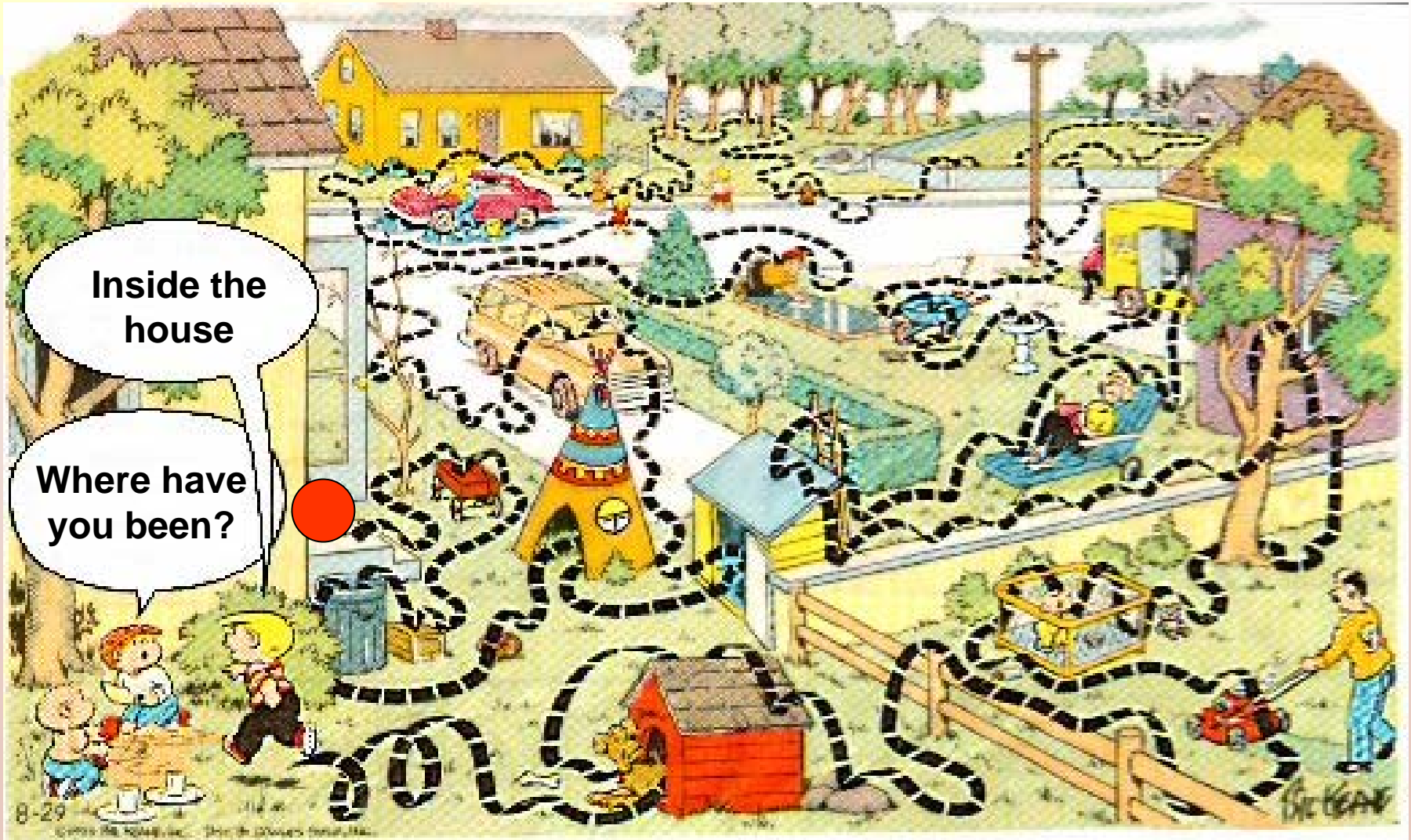


# Mobile Collaboration for Young Children

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# Why are more



**Two heads are better than one**  
**The whole is greater than the sum of its parts**



## Mobile

- Availability
- Bridges physical and traditional computing
- Ability to create in context

## Collaboration

- Important for social and cognitive development
- Can support *constructionism*
- Expanded user interface

## Young Children

- Increasing population
- Increasing usage of mobile devices
- Personal expertise

## Mobile



## Collaboration

To work together,  
especially in a joint  
intellectual effort.

([www.dictionary.com](http://www.dictionary.com))

## Young Children Ages 6-10



		Spatial	
		Co-located	Distributed
Temporal	Synchronous	Same Place & Time	Different Place, Same Time
	Asynchronous	Same Place, Different Time	Different Place & Time

# Move Beyond ...

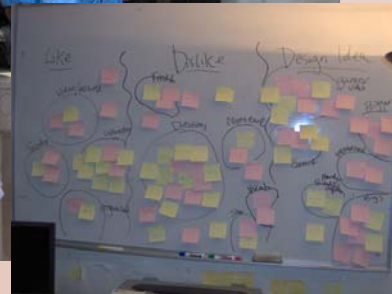
- Devices for consumption/entertainment/collection
- To make mobile devices more:
  - Collaborative
  - Child-appropriate
  - Creative, generative, constructive

- Kidsteam



- Cooperative I

(al., IDC 2004)





# Prototype System – *Mobile Stories*

## ■ Stories and Scenes

- Picture
- Text
- Sound



## ■ Client/server model

- Changes propagated to each device
- Over 802.11



# Pilot Study

- At Fort McHenry National Park



- Children create collaborative story
- Purpose
  - Directly observe children's collaboration
  - Further the design process



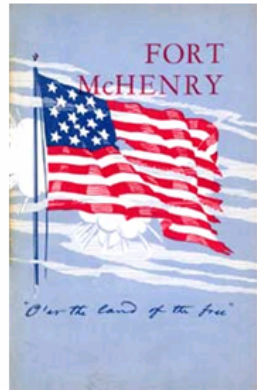
# Evolution of a Shared Scene

Fort McHenry

Anthem

Battleship

What do you think?



Fort mchenry is a park of  
history that survived  
war.

Changed ...

12:21 Picture



12:25 Text

12:27 Picture

12:31 Text

12:32 Picture

12:33 Picture

12:34 Picture

12:35 Picture

12:37 Picture

# Face-to-Face Collaboration



# Co-present Mobile Collaboration

## ■ Space-sharing



# Take Home Message

- Many ways to collaborate
- Interfaces need to support several ways
- Mobile devices need new interfaces and interactions to support these interfaces

**Mobile Collaboration for  
Young Children**

Educational learning  
The way mobile devices are used





## Acknowledgments

Kidsteam

National Park Service

Microsoft

[www.cs.umd.edu/hcil/mobilestories/](http://www.cs.umd.edu/hcil/mobilestories/)

## Questions



[fails@cs.umd.edu](mailto:fails@cs.umd.edu)







## ■ Availability

- Wood et al., 2005
- UPI, 2005
- Gartner, 2005
- Hirst, 2006

## ■ Control

- Myers et al., 2004

## ■ Digital library

- Buyukkokten et al, 2000, 2001, 2002

## ■ Device initiatives

- OLPC
- Classmate PC
- Mobilis

## ■ Narrative systems

- Sketchy (goknow.com)
- StoryBeads (Barry, 2000)

## ■ Development

- Piaget, 1971

## ■ Increasing population

- [www.census.gov/ipc/](http://www.census.gov/ipc/)
- [www/ldbpyr.html](http://www/ldbpyr.html)

## ■ Interactions

- Hua et al., 2005
- Hinckley, 2004, 2005

## ■ Grids/ad-hoc networks

- Sacramento et al., 2004
- Lima et al., 2005

## ■ Context-aware

- Davidyuk et al., 2004
- Griswold et al., 2004
- Hull et al., 2004
- Bell et al., 2006

## ■ Require Collaboration

- Zurita & Nussbaum, 2004
- Benford et al., 2005

## ■ Collection

- Rogers et al., 2004
- Broderson et al., 2005
- Haloran et al., 2004

## ■ Learning theory

- Dewey, 1916
- Piaget, 1973
- Vygotsky, 1978
- Papert, 1980, 1991

## ■ CSCW / CSCL

- Greenberg, 1991
- Tandler et al., 2001

## ■ Paradigms

- Winer & Ray, 1994
- John-Steiner, 2000

## ■ Systems

- Google Docs & Spreadsheets 2006
- MS Office Groove 2007

## ■ Development

- Vygotsky, 1978

## ■ Design

- Druin et al., 1999
- Guha et al., 2004

## ■ System

- Cole & Stanton, 2003

## ■ Narrative systems

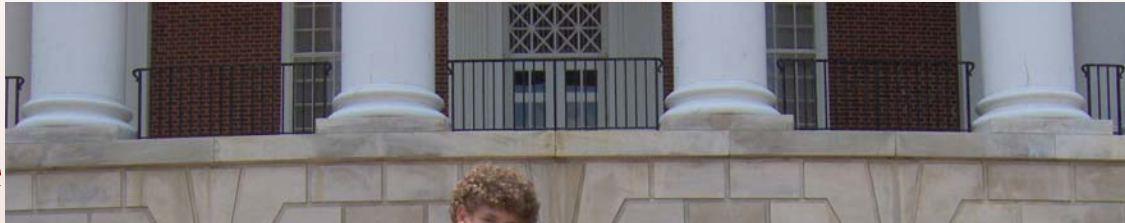
- MOOSE Crossing (Bruckman, 1997)
- PETS (Plaisant et al. 2000)
- SAGE (Umaschi & Cassell, 1997)
- StoryMaker (SpaSoft, 2005)

# Collaborative Play



# Research Approach (Design)

## ■ Kidsteam



(DC 2004)

## ■ Coope

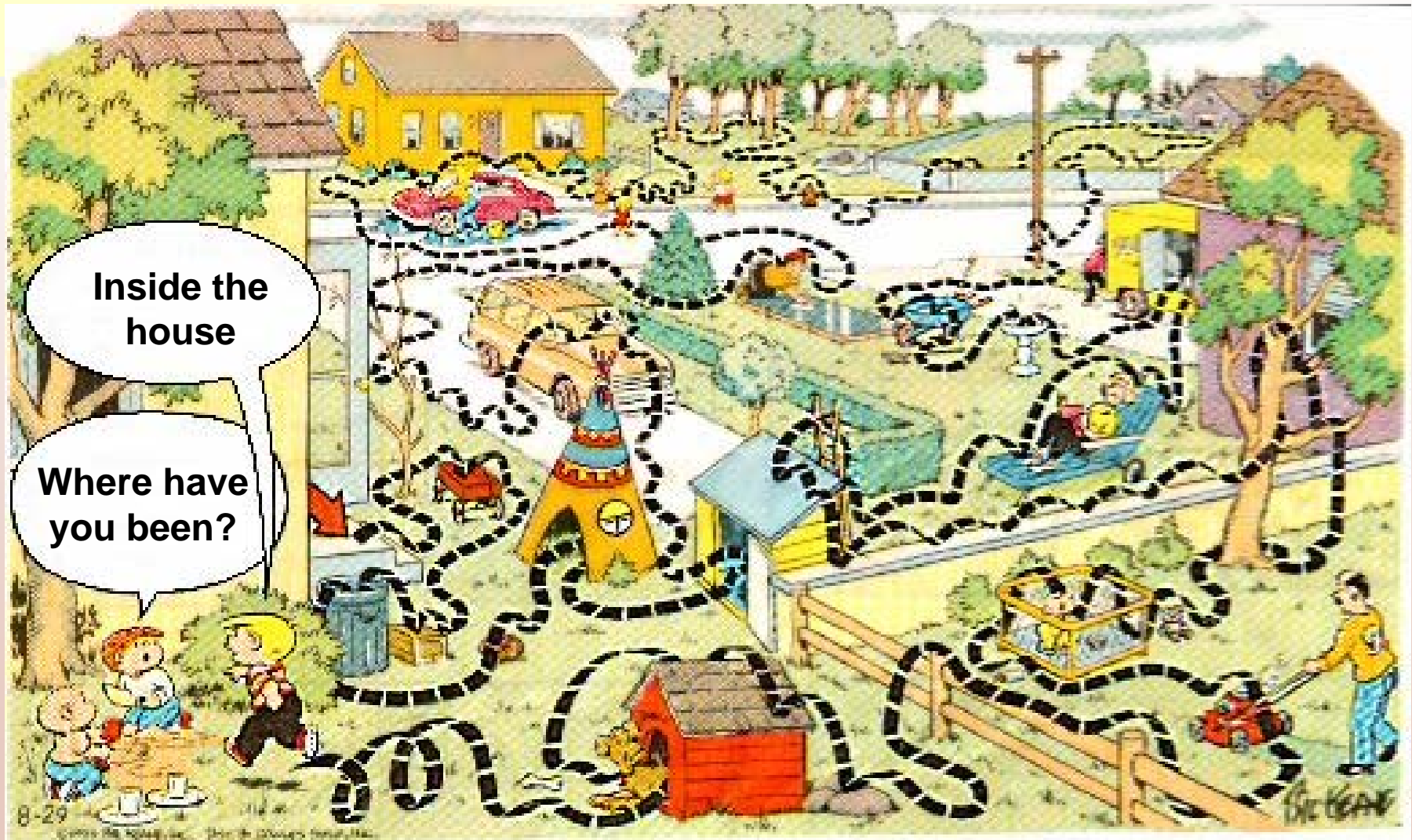


# Formative Research

- Physical vs. virtual (Fails et al., IDC 2005)
  - Mobile devices could bridge the divide
- *Tangible Flags* (Chipman et al., IDC 2006)
  - Collaboration, organizing collections
- Collections
  - Kids collect but do not (want to) organize
  - Implicit organization via narratives
- *Mobile Stories* (Fails, IDC 2007)
  - Design sessions with Kidsteam
  - Fort McHenry National Park
  - Mobile collaboration



# Children are mobile





Children are mobile

Collaboration is important  
to the social and cognitive  
development of children



**Mobile Collaboration for  
Young Children**



# Mobile Collaboration for Young Children

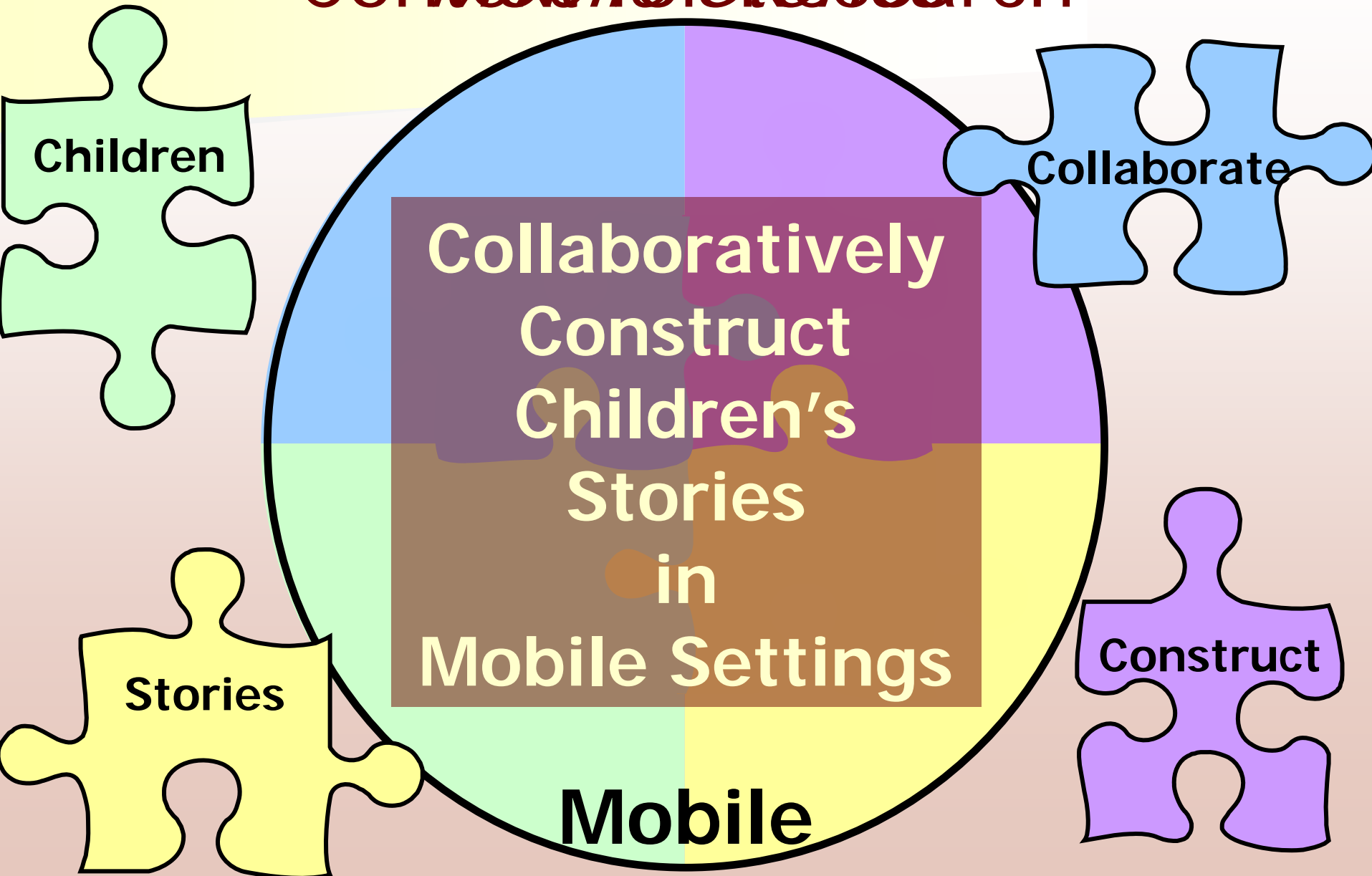
Educational learning

The way mobile devices are used





# Context for Research



# Summary / Take Home Message

- Mobile collaboration is important

# Tangible Flags

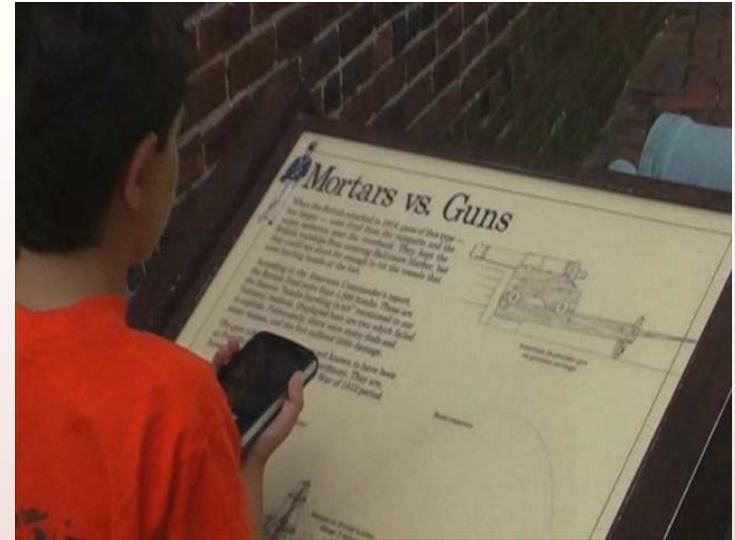
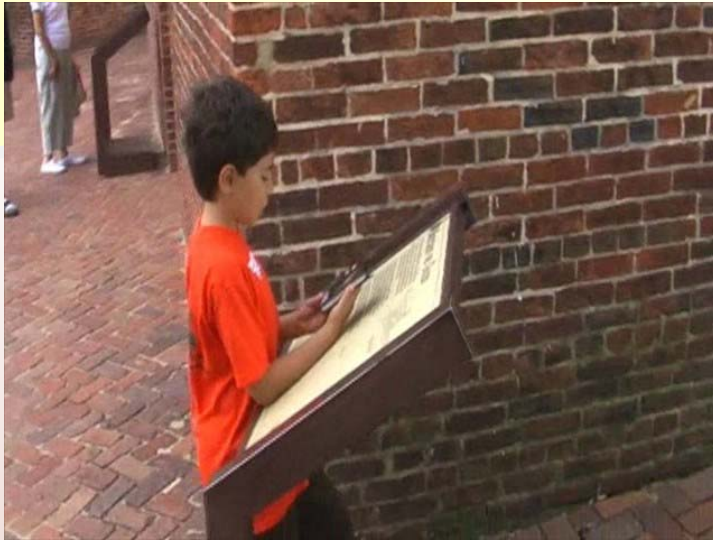
- Started breaking down the collaborative barriers
- Allowed mobility and knowledge construction
- Demonstrated the importance of construction/creation in context and collaboration

(Chipman et al., 2006)





# Audio Data Collection



Mobile Children's Stories Constructionism Collaboration



# Construction



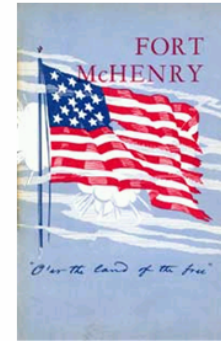
## Magazine



New Scene

(38.95 sec)

## Anthem



t he anthem:

o: say can you see by the dawn's early light what so proudly we hail  
at the twilight's last gleaming who's bright stripes and bright stars  
through the perilous fight through the ramparts we watch were so  
gallantly streaming by the rockets red glare, the bombs



New Scene

# Research Approach (Evaluation)

- Formative comparative study of interfaces
  - Within subject
  - Counter-balanced
- Field, case study
  - Focus on collaboration
  - Multiple data collection methods
    - Technology logs, video, field notes, interviews/questionnaires, collaborative stories

How do collaborative mobile technologies affect children's collaboration?

# ICDL

- International Children's Digital Library
- [www.childrenslibrary.org](http://www.childrenslibrary.org)

The screenshot shows the homepage of the International Children's Digital Library (ICDL). The browser address bar displays <http://www.childrenslibrary.org/>. The website has a green header with the ICDL logo (a stylized '@' with a child figure) and the text "INTERNATIONAL CHILDREN'S DIGITAL LIBRARY" and "A Library for the World's Children". Below the header is a navigation bar with links: "Read Books", "About Library", "People", "How to Contribute", "Press Room", "Help", and "Sign In".

The main content area is divided into several sections:

- Read Books** and **Books by Country**: Two icons representing a book and a globe.
- FEATURED BOOKS**: A section with three book covers and descriptions:
  - Meins Ganz Allein**: Written by Annegert Fuchshuber; published in the New Zealand; written in English. [Read book »](#)
  - When Sophie gets angry -- really, really angry**: Written by Molly Bang; published in the United States; written in English. [Read book »](#)
  - Why the Little Dolphin Tumbles Head over Heels and Other Stories**: Written by Ana Maria Machado; published in Brazil; written in German. [Read book »](#)
- Our Mission**: A text box stating the mission of the International Children's Digital Library Foundation is to excite and inspire the world's children to become members of the global community -- children who understand the value of tolerance and respect for diverse cultures, languages and ideas -- by making the best in children's literature available online. It includes a link to [explore our growing library](#) and [learn how you can contribute to our efforts.](#)
- THE LIBRARY**: A section with links for **First-time Visitors** ([Read Books](#), [Open a Library Account](#), [Featured Books](#)) and **Library Members** ([Sign in](#)).
- Book News**: A section with links for [Recently added Books](#), [Award-winning Books](#), and [Featured Books](#).
- THE FOUNDATION**: A section with links for [Mission](#), [Letter from the Director](#), [Board of Advisors](#), and [Foundation Team](#).
- SUPPORT THE LIBRARY**: A pink box with a [Make a Donation](#) button.

At the bottom, there is a text box with a quote from Daina Bolsteins, a Master of Library Science student at the University of Maryland, dated September 25th, 2006, expressing her love for children's books and a link to [Read more »](#).

# Prototype Limitations (2 of 2)

- No integrated camera
- Range of wireless (for collaboration)
- Interface
  - Screen space
  - Simple scene/page paradigm

# Children are mobile

Collaboration is important  
to the social and cognitive  
development of children

Where have  
you been?

## Mobile Collaboration for Young Children