

**MEA CULPA..**

**“Oh, How We Have Fallen”**

**We have forsaken all agents  
We have left student models unbuilt  
We have even abandoned the 2-sigma difference**

**“Come speak at ITS '04, that will restore your faith”**

**Stefano Cerri, Bill Clancey, Kurt VanLehn, Beverly Woolf, Lewis Johnson**

**“Thank you...but, it's too late... we are too far gone!”**

**Cathie & Elliot**

# The Kids These Days.... .....Can't Wait



**And  
Neither  
Could  
We!**

Cathie Norris & Elliot Soloway  
U of North Texas, U of Michigan

# Today's Story

- **Why 1:1?**
- **How To Achieve 1:1?**
- **Life in the Handheld-Centric Classroom**
  - **For Students**
  - **For Teachers, Administrators, Parents**
- **Where's the Evidence?**
- **Look to the Future**
- **Stop**

# Our Children Aren't Failing Our Educational System is Failing

- **Education is the key to a better future**
- **But:**
  - **90% of prisoners can't read**
  - **30-50% drop out rate**
- **Desperate attempts at addressing appalling need**

# Use Technology !!

- **Why?**
- **Technology engenders productivity gains everywhere else**
- **Digital Age Children**

# Digital Age Children

**“What seems clear is that the experience of schooling recounted by many of the most Internet-savvy students ... is fundamentally different from their parents.... And fundamentally different from their older siblings.” Pew Report**

**“Students are not just using technology differently today, but are approaching their life and their daily activities differently because of technology.. Getting directions, checking on sports teams schedules, visiting college websites, sending invitations, buying movie tickets, visiting online museums...” Speak Up Day Report**

**“These students said over and over that their schools and teachers have not yet recognized – much less responded to – the fundamental shift occurring in the students.....:” Pew Report**

# Our Fall Begins....

## ➤ **Cathie's Epiffany**

- AERA AI & Ed SIG Meeting
- Majority of attendees said impact would come in 25 years
- *Moved from CS to Ed the next week!*
- N.B. Cathie was a math teacher for 10 years

## ➤ **Elliot's Epiffany**

- Saw how hard Lewis Johnson worked on Proust – there must be an easier way!!
- Judy gave birth to Daniel; worked in New Haven 6<sup>th</sup> grade (Police came to my house....*another* story)
- *Just stopped:* making machines smarter.. Tried to make kids smarter!

## ➤ **Kids can't wait.. And neither could we!!!**

# CMU - Kept the Flame Alive!

- **John Anderson didn't see/care how hard Ken Koedinger & Al Corbett worked**
- **Kurt VanLehn added to the brain trust**
- **Bingo! Tutoring technologies that were effective**
- **Carnegie Learning, Inc – who can argue with success?**

**Maybe.....**

**We bailed**

**.....too early?**

**NO !!!**

# New Mantra: It's the Interface!

- There **MUST** be a faster way to improving technology in education!
- Build interfaces expressly to support learners

# Learner-Centered Design

## Learners Are Not Just Short Users

|                 | User-Centered Design (UCD)                | Learner-Centered Design (LCD)                         |
|-----------------|---|---|
| Audience        | Users                                     | Learners  |
| Characteristics | Assumed: Motivated, Homogenous, Competent | Wavering motivation<br>Diverse<br>Change All The Time |
| Design Problem  | Tools easy to learn and use               | Tools for learning work                               |
| Theory          | How people use tools                      | How people learn                                      |



# Not JUST Technology...

## The Six Conditions

- **Adequate access to technology**
- **Appropriate curriculum**
- **Sufficient professional development**
- **Relevant assessments**
- **Supportive school culture**
- **Supportive family and community**

# Scientifically-Based Research

## Achievement: Michigan's MEAP

|                              | <b>Proficient</b> | <b>Novice</b> | <b>Not Yet<br/>Novice</b> |
|------------------------------|-------------------|---------------|---------------------------|
| <b>Others</b>                | <b>13%</b>        | <b>39%</b>    | <b>48%</b>                |
| <b>HI-CE<br/>participant</b> | <b>22%</b>        | <b>49%</b>    | <b>29%</b>                |

**Bottom line: Raise ALL children >10%**

# Is This “Adequate Access”?

- **Snapshot Survey (10,000 educators in US)**
  - 65% of teachers have students use Internet for 15 minutes/per week or less.
- **Current ratio:**
  - U.S. 5:1 and 9:1 (urban)
  - Europe 24 : 1
- **Impact of buying “more” computers?**
  - Negligible
- **“Single greatest barrier to Internet use at school is the quality of access”**
  - Student Opinion, Pew Report, 8/14/04

# 1:1 Access

1 computer per 1 student, 24/7

- Laptops
- Scaling is THE Challenge

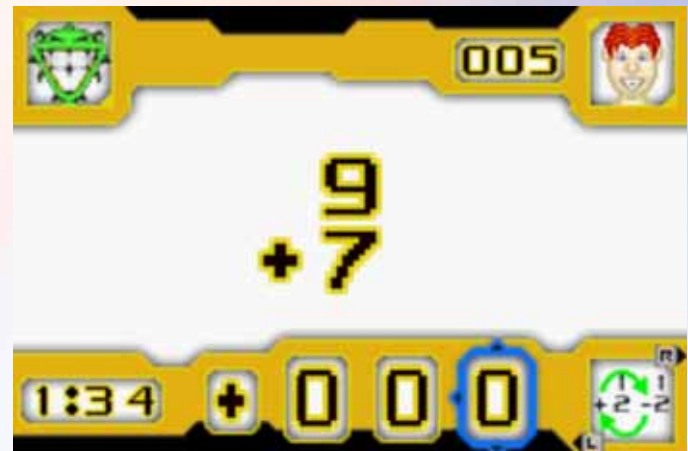
Maine



# How To Achieve 1:1?

- **Task-Appropriate Technology**
  - What is appropriate for teaching and learning?
  - Grade level, content area, student needs, etc.
- **Graphing Calculator**
  - Math has had 1:1 for years... shhhhhh!!!
- **Gameboys for basic math & reading**

# Task-Appropriate Technology !!



# How To Achieve 1:1?

- **Opportunity:**

- PalmOS/PocketPC/Symbian devices ...
- @ \$\$\$ pair of tennis shoes -- \$100

- **Design Challenge:**

- Small screen, mobile

- **ONLY WAY TO ACHIEVE 1:1  
IN OUR LIFETIME**



- 1 handheld/child
- Leverage existing investments

# Handheld-Centric Classroom

# **What Does a Handheld-Centric Classroom Look Like?**

**Student View  
Teacher View**

# Design Guidelines

- **Simple, Simple, Simple**
  - **Minimize impact on teacher**
  - **Olde Days: Teachers must change everything to use tech**
  - **Logo – Divorced from curriculum**

# Design Guidelines

- **Simple, Simple, Simple**
  - **Minimize impact on teacher**
- **Highly Manipulative**
  - **Task Appropriate**
  - **Social Constructivist**
  - **Use handhelds 95% of the school day**

# Design Guidelines

- **Simple, Simple, Simple**
  - **Minimize impact on teacher**
- **Highly Manipulative**
  - **Task Appropriate**
  - **Social Constructivist**
  - **Use handhelds 95% of the school day**
- **Learner-Centered**
  - **Learners have special needs**

# Design Examples: HLE Tool Suite

|  | <b>Kids</b>   | <b>Teacher</b>   |
|--|---|--|
| <b>Simple, Simple,...</b>                        | <ul style="list-style-type: none"><li>•Task-appropriate</li></ul>   | <ul style="list-style-type: none"><li>•Fits into existing curriculum</li></ul> |
| <b>Manipulative</b>                              | <ul style="list-style-type: none"><li>•Whole Project</li></ul>  | <ul style="list-style-type: none"><li>•Whole Project</li></ul>                 |
| <b>Learner-centered<br/>(classroom friendly)</b> | <ul style="list-style-type: none"><li>•Visible Toolbar</li><li>•Task vs File Storage</li><li>•Relationship Prompt</li></ul> | <ul style="list-style-type: none"><li>•Collaboration</li></ul>                 |



# Design Examples: Cooties Participatory Simulation

Communicable Disease Unit – 7<sup>th</sup> Grade

|  | <b>Kids</b>   | <b>Teacher</b>  |
|--|---|---|
| <b>Simple, Simple,...</b>                    | <ul style="list-style-type: none"><li>•Task-appropriate</li></ul>                   | <ul style="list-style-type: none"><li>•Fits into existing curriculum</li></ul>      |
| <b>Manipulative</b>                          | <ul style="list-style-type: none"><li>•Engaging physically &amp; mentally</li></ul> | <ul style="list-style-type: none"><li>•Engaging – but still under control</li></ul> |
| <b>Learner-centered (classroom friendly)</b> | <ul style="list-style-type: none"><li>•Paper worksheet</li></ul>                    | <ul style="list-style-type: none"><li>•Collaboration</li></ul>                      |

# Cooties: How Are Germs Spread?

## Participatory, Immersive Simulation



# Design Examples: HLE Tool Suite

|  | <b>Kids</b>   | <b>Teacher</b>   |
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# “Where do I start?”

With your existing curriculum!



# Handheld-Centric Classroom

Teacher & Curriculum



Administrator

Parents



Desktop, Internet, Handhelds, Probeware, Cameras

# Design Examples: PAAM

PalmOS/PocketPC/PC Archive and Application Manager

|  | <b>Kids</b>   | <b>Teacher</b>   |
|--|---|--|
| <b>Simple, Simple,...</b>                    | <ul style="list-style-type: none"><li>•One click, push &amp; pull</li></ul>                         | <ul style="list-style-type: none"><li>•1 teacher manages classroom of 30 handhelds/documents</li></ul> |
| <b>Manipulative</b>                          | <ul style="list-style-type: none"><li>•Move documents from handheld to PC for elaboration</li></ul> | <ul style="list-style-type: none"><li>•1 teacher manages classroom of 30 handhelds/documents</li></ul> |
| <b>Learner-centered (classroom friendly)</b> | <ul style="list-style-type: none"><li>•Interact with teacher &amp; parents</li></ul>                | <ul style="list-style-type: none"><li>•1 teacher manages classroom of 30 handhelds/documents</li></ul> |

PAAM :: Palm Artifact and Assessment Manager - Microsoft Internet Explorer

Address: http://paam.goknow.com/main.html

**PAAM** PALM OS™ ARTIFACT & ASSESSMENT MANAGER

5AllowayJ111223 [rename | move to group | delete]

logoff

Guest Group

- 5th Grade
  - Mr. Barnes
    - test
      - 5AllowayJ1112
      - 5DonnellyT478
      - 5OlsonJ12457
    - Ms. Abbot
      - 5EdwardsB55E
      - 5ErdwinN2135
      - 5OwensB4187
    - Ms. Cooper
  - 6th Grade
  - 7th Grade
  - 8th Grade
  - turtles

move copy archive delete

Last Sync: Friday, December 20th, 2002 06:30:11 PM

| Name   | Type      | Last Sync                       |
|--|-----------|---------------------------------|
| <input type="checkbox"/> 1/6/03 - LA- First Draft due. | Date Book | January 7th, 2003 01:17:44 PM   |
| <input type="checkbox"/> 1/8/03 - Fundraiser Meeting   |           | January 7th, 2003 01:17:44 PM   |
| <input type="checkbox"/> 1/8/03 - LA- first draft due  |           | January 7th, 2003 01:17:44 PM   |
| <input type="checkbox"/> 1/8/03 - LA- first draft due  |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> 1/8/03 - LA- First Draft due  |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> 1/8/03 - Fundraiser Meeting   |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> 1/10/03 - Parent permission   |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> 1/15/03 - River Field Trip    |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> 1/17/03 - Turn in: Math all   |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> 1/23/03 - Winter Band concert |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> Atmosphere Notes              |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> aldjsflaksdfjlasdf            |           | January 7th, 2003 01:37:29 PM   |
| <input type="checkbox"/> Democracy                     |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> Our Solar System              |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> Wolf Island                   |           | ember 20th, 2002 06:30:11 PM    |
| <input type="checkbox"/> Energy                        |           | December 20th, 2002 06:30:11 PM |

Archive Trashcan

PiCoMap

- Backup & Restore
- Assess
- Portfolio
- Parents & Administrators

**This Works!**  
**Over 100,000 Downloads**  
**....all over the world**

**FREE!**

**So What?**

**Free is NOT Sustainable**



# GoKnow, Inc

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

- **Goals:**
  - **Develop, Scale, Evaluate**
  - **Pipeline: HI-CE to GoKnow**
  - **Technology & Education**
  - **Focus: HANDHELDS!!**

Introducing



# The Handheld Learning Environment

*PAAM for Teachers*

**\$19.95/unit**

*Handheld  
Lessons*

*Tool Suite For  
Students*



*Support*

*Professional  
Development*



# Education Changed....

1 child : 1 pencil

1 child : 1 book

1 child : 1 computer

- **“Today’s students believe strongly that technology use is important to their education”**

•**Speak Up Day**

- 97% of students in grades 7-12, 82% if students in grades K-3**

- “Students in all grades chose their teacher as the person they are most likely to share a good idea with about improving technology at their school.”**

•**Speak Up Day**

# What To DO Next?: **OPTIMISTIC!**



**An Opportunity:**

**Cheap but powerful technology**

**We know how to make it useful – Now!**

**We can not ask our  
children to wait!**