Our Student’s World

Primary School
Born 2010
Age 5
Age 11
Age 14

Middle School
Born 2004
Age 11

High School
Born 2001
Age 14

University
Born 1997
Age 18

1994
1998
2001
2004
2006
2007
2008
2010
2015

Our Student’s World
Challenge #1
Engaging a new generation
Apple’s Education Goal

“All books, learning materials, and assessments should be digital and interactive, tailored to each student and providing feedback in real time.”

Steve Jobs
Challenge #2
Leverage Academic Research

“The human brain appears to have been designed to solve problems related to surviving in an outdoor setting in unstable meteorological conditions and to do so in near constant motion.”
So, if you wanted to design a learning environment that was directly opposed to what the brain is naturally good at doing, you’d design a frickin’ classroom!

John Medina
“The brain wants an ecosystem. Reducing information to easily manageable and discrete chunks actually diminishes engagement because it goes against the ways our brains were formed to work.”

John Medina
Leverage Education Research

TCPK Ecosystem

Koehler and Mishra
Challenge #3
Raise the expectation for the role of technology in learning
Leverage Education Research

SAMR Model

**Transformation**
- **Redefinition**: Technology allows for the creation of new tasks, previously inconceivable
- **Modification**: Technology allows for significant task redesign

**Enhancement**
- **Augmentation**: Technology acts as direct tool substitute, with functional improvement
- **Substitution**: Technology acts as direct tool substitute, with no functional change

Puentadura
Challenge #4
Change the classroom learning experience
Apple’s Classroom of Tomorrow Today
2008-2010

Apple Classrooms of Tomorrow
~Learning in the 21st Century~
April 2008

Relevant
Creative
Collaborative
Challenging
Leverage Education Research

Bloom’s Taxonomy

Higher Order Thinking Skills
- Demonstrating
- Evaluating
- Analyzing
- Applying
- Understanding
- Remembering

Lower Order Thinking Skills
- Listing
- Defining
- Describing
- Explaining
- Analyzing
- Practicing
- Applying
- Demonstrating
- Evaluating
- Creating

Increasing difficulty
What the student cannot accomplish:

Zone of Proximal Development

What the student can accomplish unaided:

Collaboration and Personal Learning

Adapted from Lev Vygotsky
**DEFORMED FROGS ARE PARASITES TO BLAME?**

### Problem
- Deformed frogs first appeared in 2006 by a school outside of our town in Michigan.
- Frogs are essential in our natural ecosystem, including agriculture.
- The disease continues to spread to more areas.

**Hypothesis**
- Bacteria parasite seizes a healthy host.
- Parasites are introduced into the frog through the parasite.
- Select fish in a member of a same gene family to test for infection.
- Select fish with the highest developmental period as the test fish.

### MATERIALS
- **Equipment:**
  - Fish tank
  - Fish food
  - Water tank
- **Fish:**
  - Goldfish
  - Tilapia
- **Equipment:**
  - Microscope
  - Pipette
- **Data:**
  - Temperature
  - Water quality

### Procedure
- **Search literature on deformed frogs**
  - General Population
- **Lactate parasite**
  - Find 10 species with both parasites
  - Collect 10 specimen samples with parasites
  - Amplify DNA with specific primers in the specimen
- **Extract DNA from parasite**
  - Test for DNA using Bio-Rad
  - Use primers to amplify parasite DNA
  - Test DNA using Bio-Rad
  - Use primers to amplify parasite DNA
  - Test DNA using Bio-Rad
- **Use BanditsTech.com to search for gene expression in frog tissue**
  - Compare with Dr. Sanger and Dr. Hahn's data from gene expression
  - Find 100 genes that are similar

### Analysis
- **PCR method the parasite DNA**
  - PCR with primer pairs: parasite DNA plus normal with human gene (control)
- **PCR product:**
  - Test for parasite DNA using Bio-Rad
  - Use primers to amplify parasite DNA
  - Test DNA using Bio-Rad

### Conclusion
- Bands with parasite DNA indicate conserved regions that exist in parasite genome.
- Parasites are introduced into the frog through the parasite.
- The anti-fish test on the parasite samples indicate these bands are specific DNA transformation in PCR reaction.
- Experimental results support the additional research.

**References:**

**Acknowledgements:**
- Thank you to the support of BanditsTech.com.

**Author:**
- Jordan Couch
- 2.4.01
- Michigan State University
“Knowledge is not a commodity that is delivered from teacher to student but something that emerges from the student’s own curiosity-fueled exploration.”

Joshua Davis, Wired Magazine
How a Radical New Teaching Method Could Unleash a Generation of Geniuses
Collaborative Classroom

Community

Teachers

Students
<table>
<thead>
<tr>
<th>Topic</th>
<th>&quot;Education&quot;</th>
<th>&quot;CBL Learning&quot;</th>
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<td>Overall Paradigm</td>
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<td>Social Structure</td>
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<td>Grades and Certification</td>
<td>Skills and Experience</td>
</tr>
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</table>
Alex story (Jody) video here - need commentary for after - short and sweet
“Individuality matters — the individual is not error, and on the human qualities that matter most (like talent, intelligence, personality, and character) individuals cannot be reduced to a single score.”
“Any system designed around the average person is doomed to fail.”

“Precision Pedagogy”
5th Grade Class

Grade Level

Students

Reading Level
Math Level
Goal
Leverage Education Research

Flow

Source: Adapted from Mihaly Csikszentmihalyi
Elizabeth Forward District-Pittsburgh

K-3 300 students

Winter 2014

29% Without Technology

Spring 2014

68% With Technology
Challenge #6
Re-evaluate student assessment
“The role of the teacher is to create the conditions for invention rather than provide ready-made knowledge.”

Seymour Papert
Looking Forward - Are we ready?

Artificial Intelligence
Adaptive Learning
Intelligent Assistants
The Internet of Things
3D Printing
Interactive Books
Visual Reality
Augmented Reality
Holograms
The way we design our classrooms today will ultimately define our societies tomorrow.