

MILL

Mobile Innovation Learning Lab



Matt Dunleavy, Ph.D.
Radford University



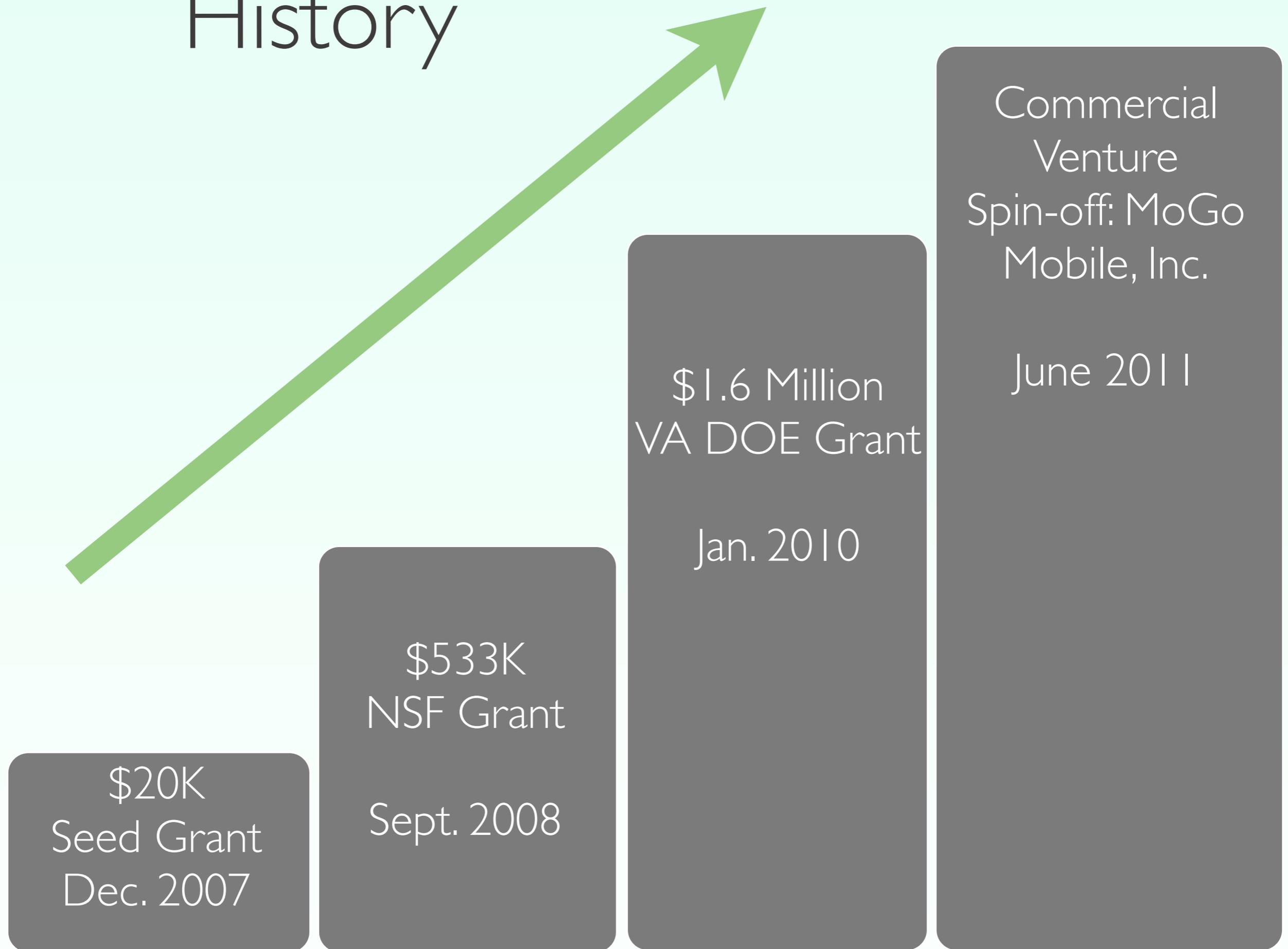
What does the MILL do?

We develop:

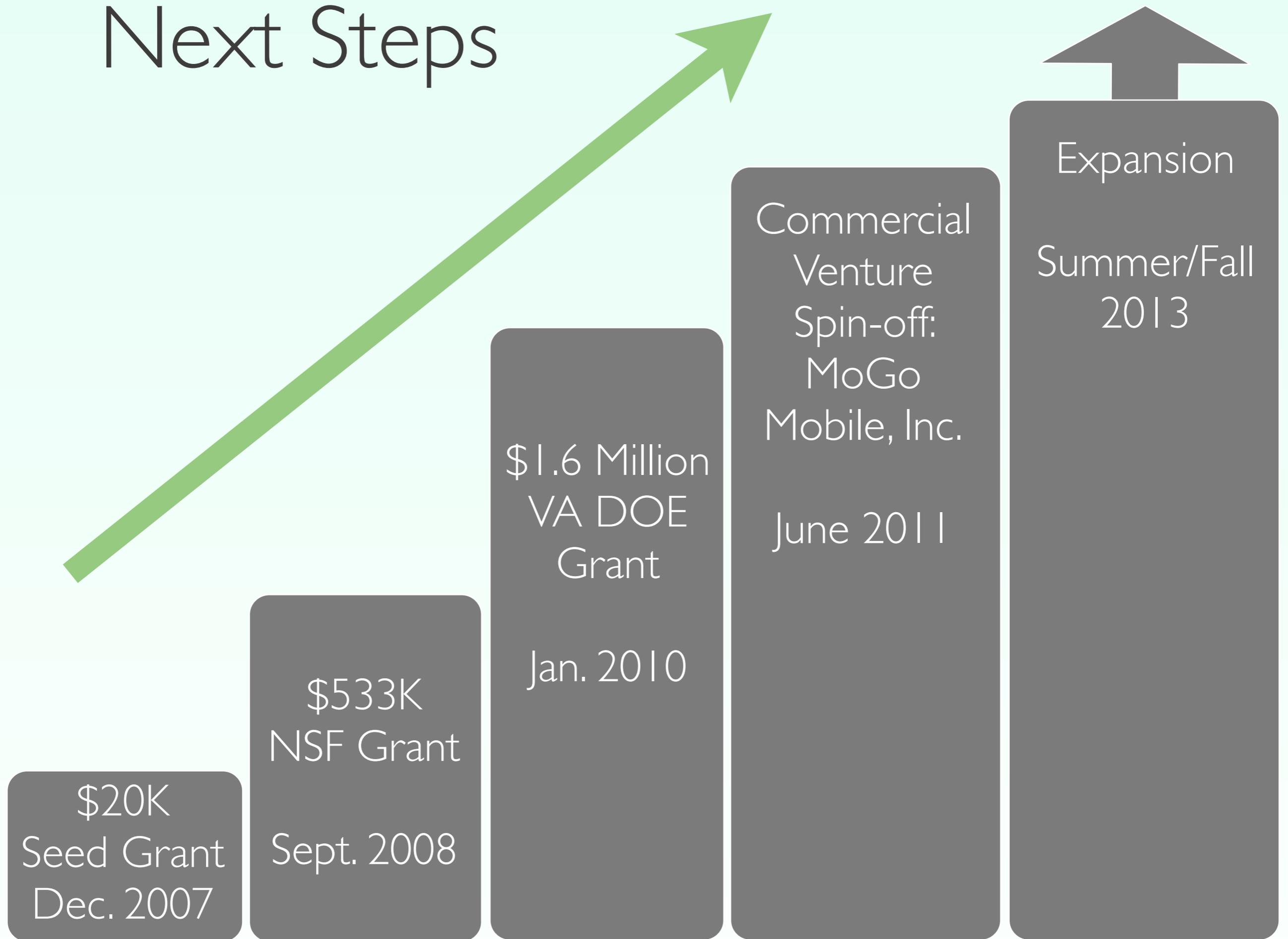
- iPad and iPod touch apps for K-12.
- Augmented Reality (AR) software.



History



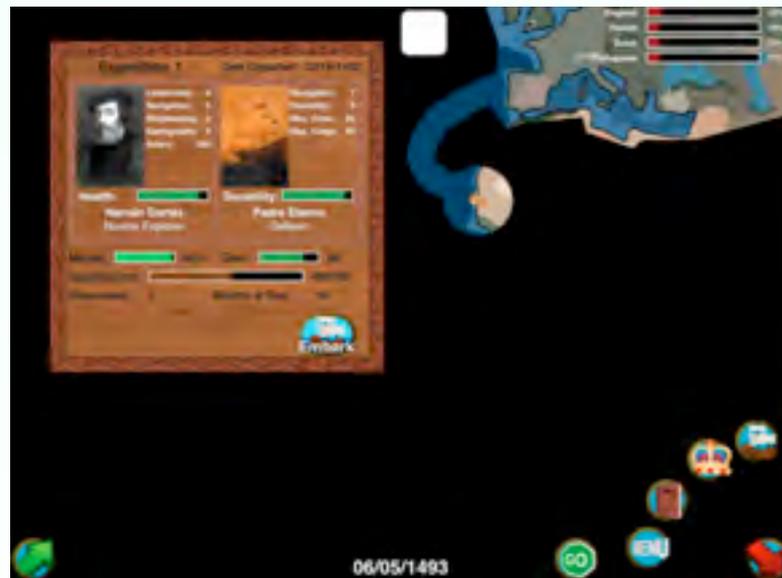
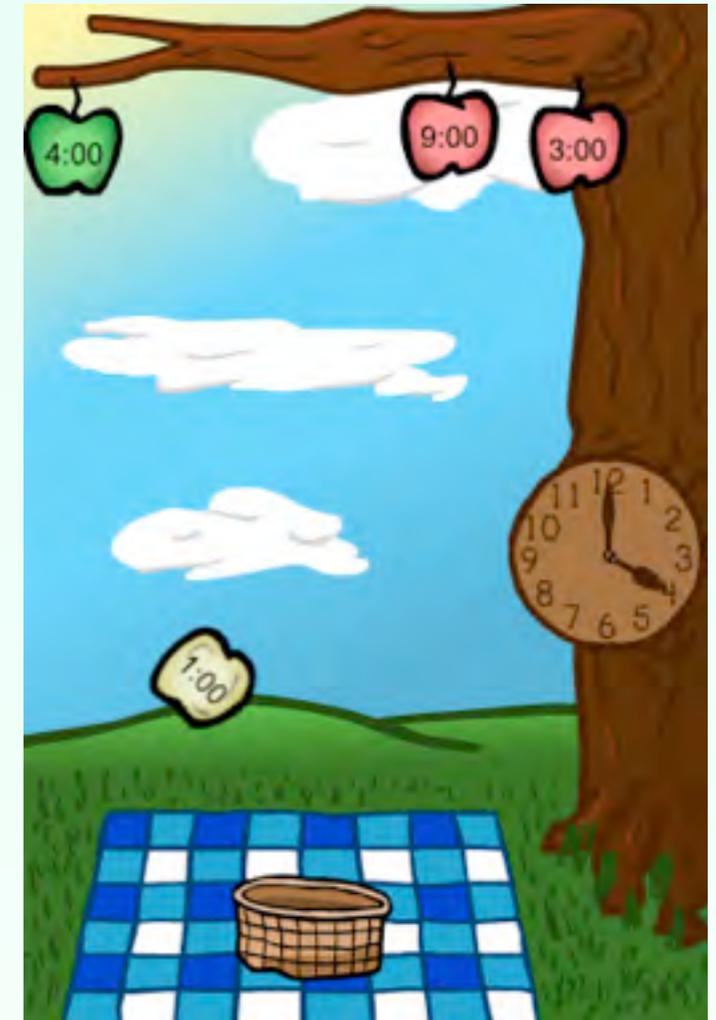
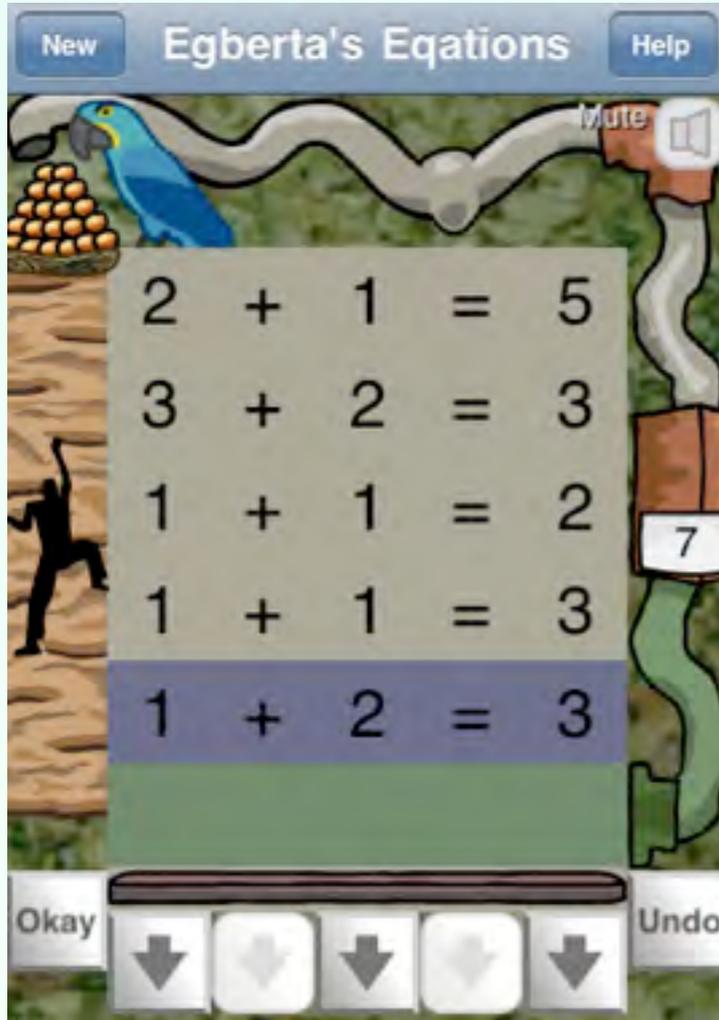
Next Steps



What are the results?

- Trained 15 graduate research students, software engineers, graphics artists, and audio engineers in cutting edge, competitive skills.
- Received awards from the 2009 and 2010 Virginia Mobile Learning Apps Development Challenge funded by the Governor Productivity Investment Fund.
- Created 20 STEM and ELA iPod touch and iPad games, which have been downloaded an estimated 200,000 times from 7 different countries.
- Co-authored with RU students two VA DOE reports, two book chapters, three websites, and numerous conference papers.
- Received international recognition in the 2011 and 2012 Horizon Report.
- Collaborated with premier universities in this country in AR R&D: Harvard University.
- Secured over \$2 million in external awards (i.e., NSF, Qualcomm, VA Dept. of Education).
- Invented AR software and submitted a patent application: historical precedent.
- Created a revenue share with early stage start up.
- Recognized as a leader in the state in mobile learning technology and a leader in the country in AR R&D (e.g., think tanks, speaking invitations).
- Prepared students to master 21st century skills to compete in a global marketplace.

K-12 SOL-aligned Apps



Example of the SOL-aligned iPod Touch App



Freddy Fraction (2nd place VA Mobile Apps Competition): High need SOL priorities: 1. fraction computation; and 2. equivalent relationships among fractions, decimals, and percents.

Design Template Approach



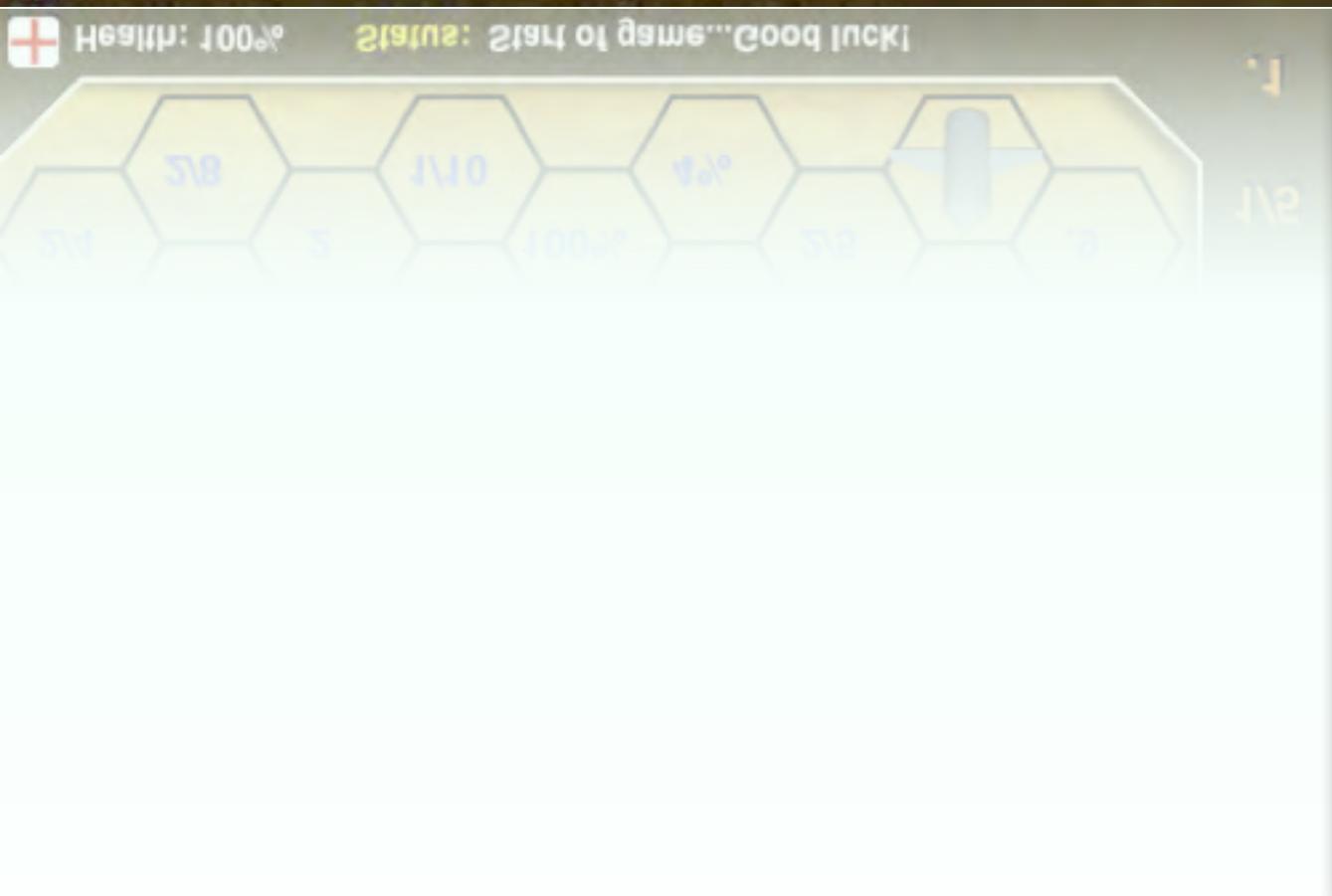
Fraction computation and equivalent relationships among fractions, decimals, and percents.

Design Template Approach



VA SOL Math 1.8 Students will recall basic addition facts.

Design Template Approach



Cell Defender



iPad game teaching cell structure and organelles.

AUGMENTED REALITY TEACHING AND LEARNING



Grant No. DRL-0822302



Photo Credit: Mike Shaw | The Burgs.

What is Augmented Reality?

Two forms of AR...



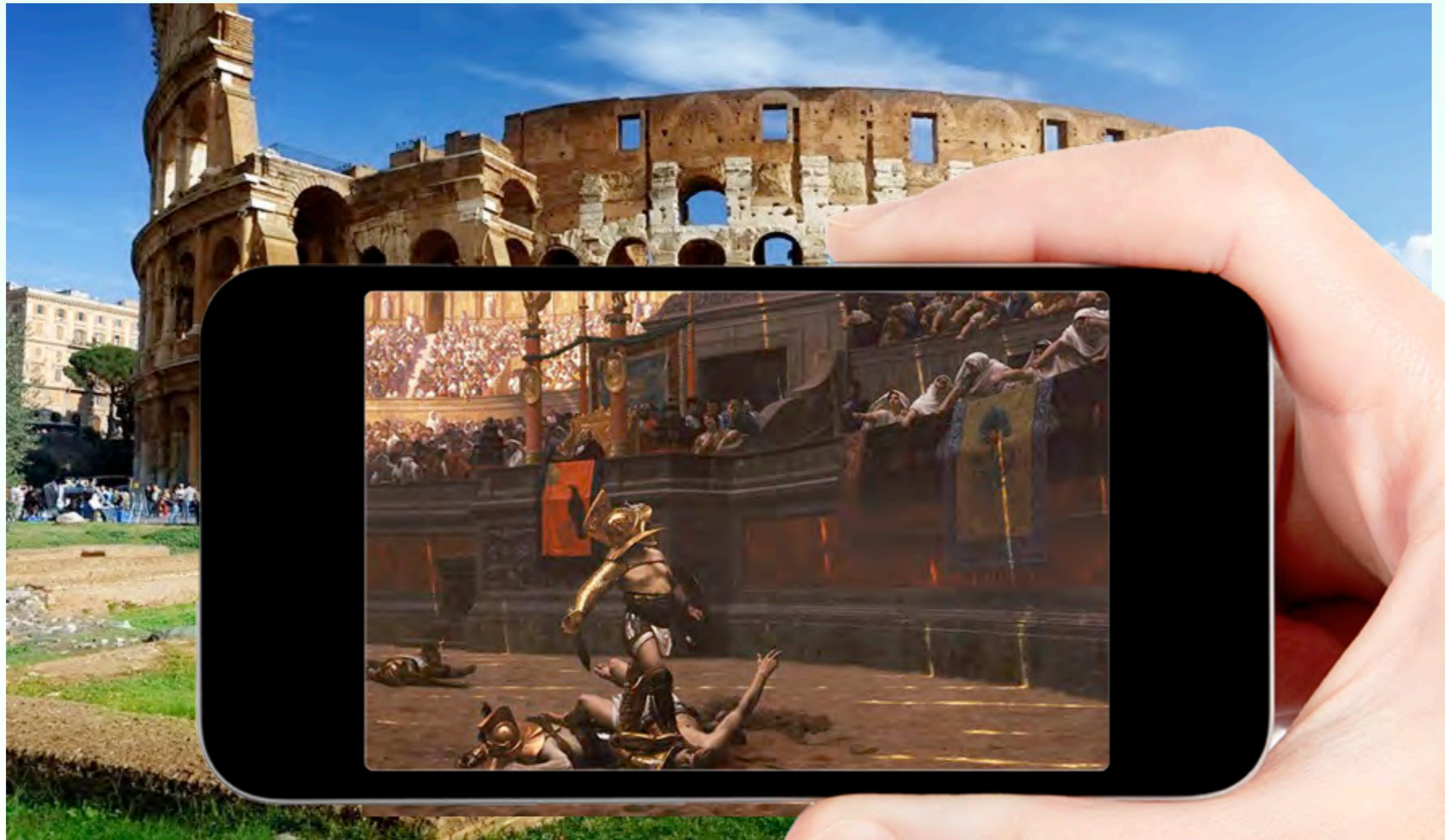
LOCATION
GPS-Based



VISION (MARKER)
Camera-Based

What is Augmented Reality?

LOCATION
GPS-Based



What is Augmented Reality?

VISION (MARKER)
Camera-Based



Triggers



What is Augmented Reality?

Using mobile, context-aware (e.g., smartphones, tablets) to interact with digital information embedded within the physical environment.



Photo Credit: SITP

What is Augmented Reality?

The phone becomes a ***magic looking glass***, identifying objects in the world around you.

David Pogue, *Scientific American*
December, 2011



Wide Range of Uses



Education



Tourism



Gaming



Training



playfreshair.com

What is FreshAiR™?

FreshAiR Editor



FreshAiR App



FreshAiR™ Editor



Fresh AIR FreshAiR in London Save Publish

Map Build Roles Items Content Media Settings Change Game

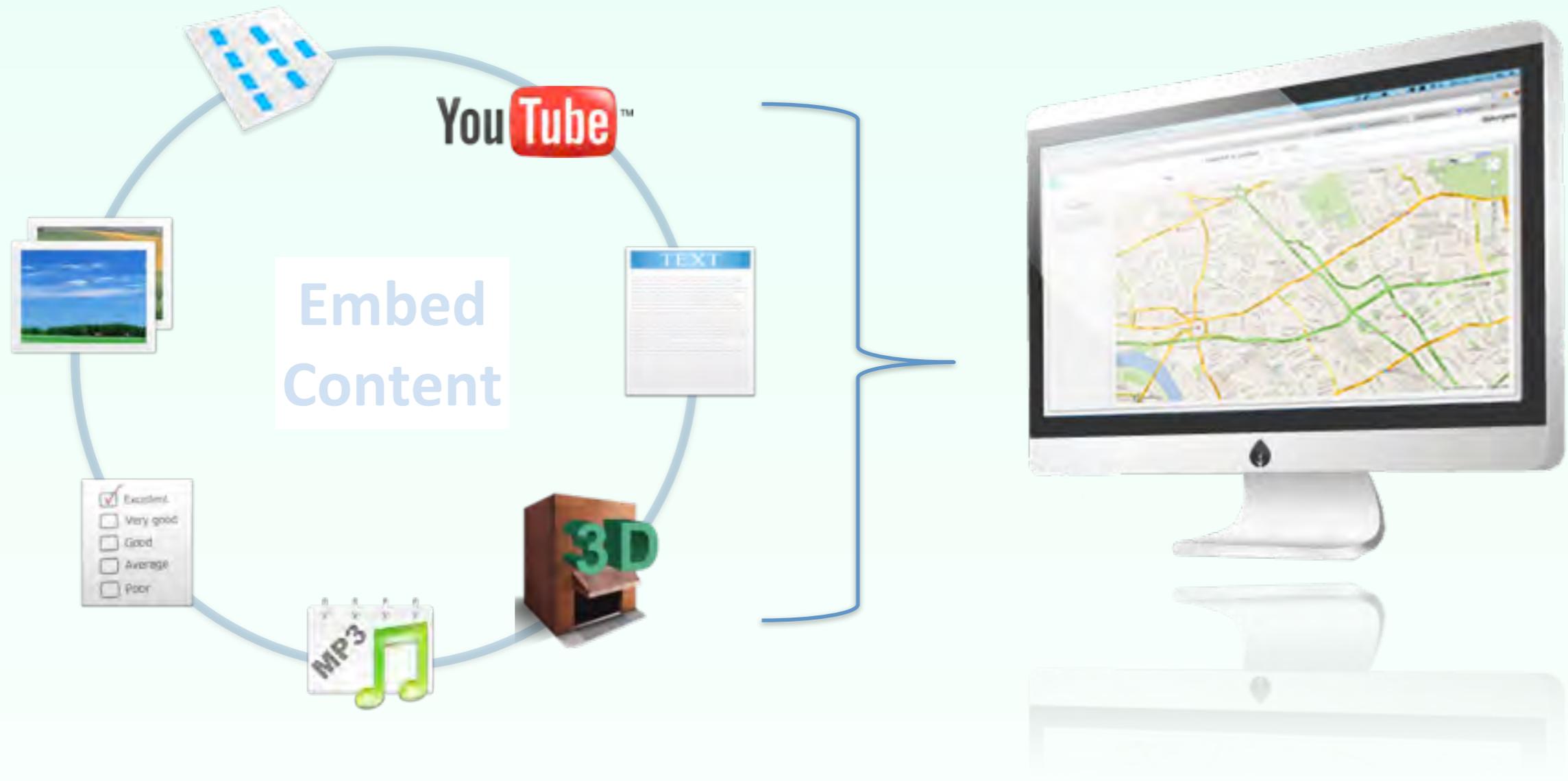
Locations

Search for a location...

- National Hall
- Blythe House
- Brook Green
- Create a Location

Map data ©2012 Google Terms of Use

FreshAiR™ Content



FreshAiR™ App



Apple's iOS



Google's Android

Harvard University's EcoMOBILE



School In The Park (SITP)



Content: Science

Objective: Understand the habitat, behavior, and anatomy of the condor, rattlesnake and burro.

Rationale: Leverage vision-based AR (Vuforia) to reveal the anatomy of animals in the zoo to meet instructional objectives.

Partners: Qualcomm Wireless Reach, SITP

School in the Park - San Diego Zoo



Photo Credit: SITP

VISION (MARKER) Camera-Based

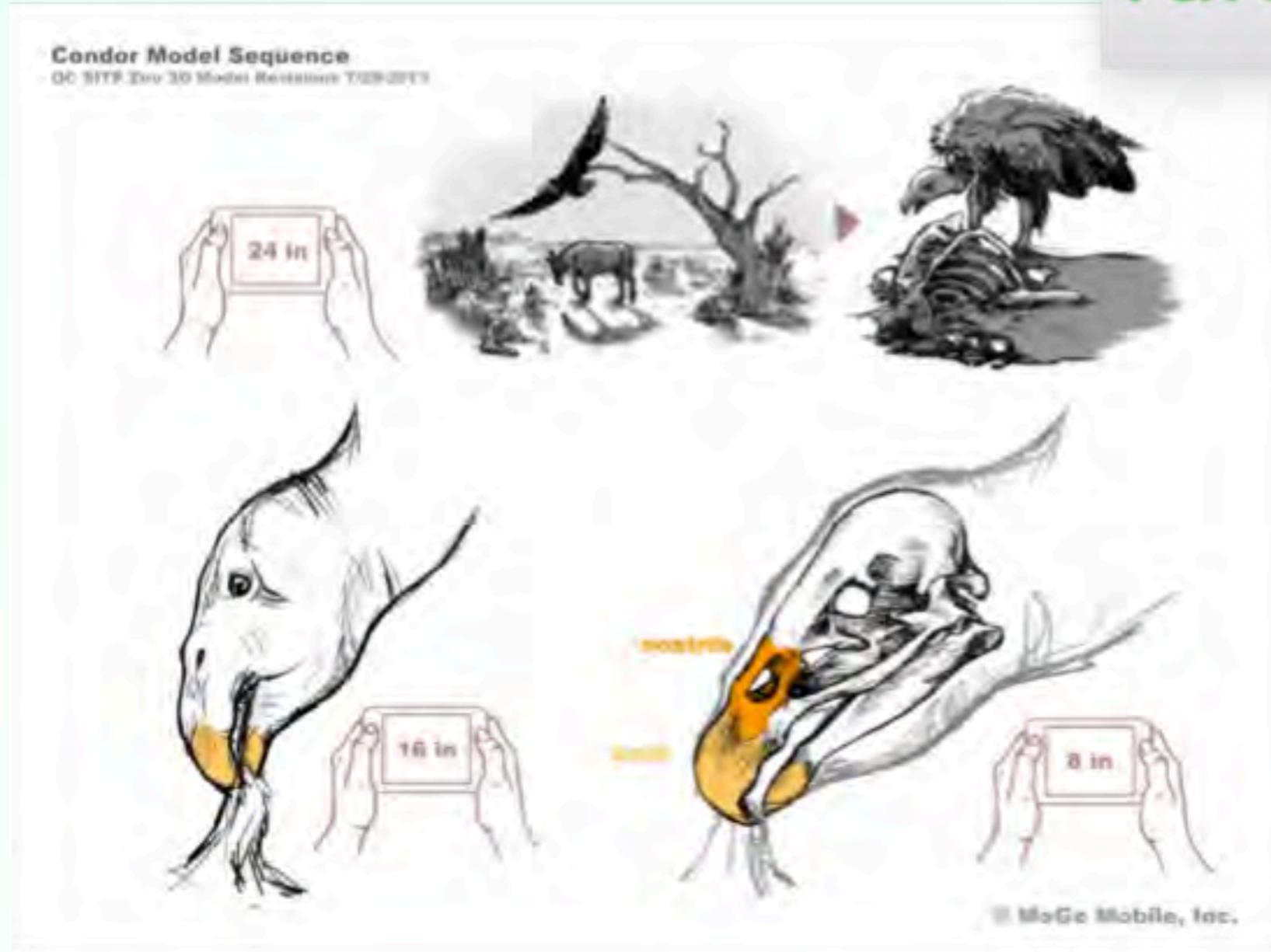


Triggers



Examples or Use Cases

San Diego Zoo: Condor Exhibit



Design Success: Technology reveals otherwise invisible aspects of reality.

Examples or Use Cases



Examples or Use Cases

Western Australian Independent Schools



Design Success: Revealing hidden stories.

Courtesy of Jan Clarke, AISWA

Future Research & Development

- Target international and domestic STEM apps market (Immediate).
- Target international and domestic ELL apps market (Immediate).
- Build analytics with teacher dashboards for all Apps.
- Refine AR software user-interface (6-12 months).
- Innovate on location-based AR (6-12 months).

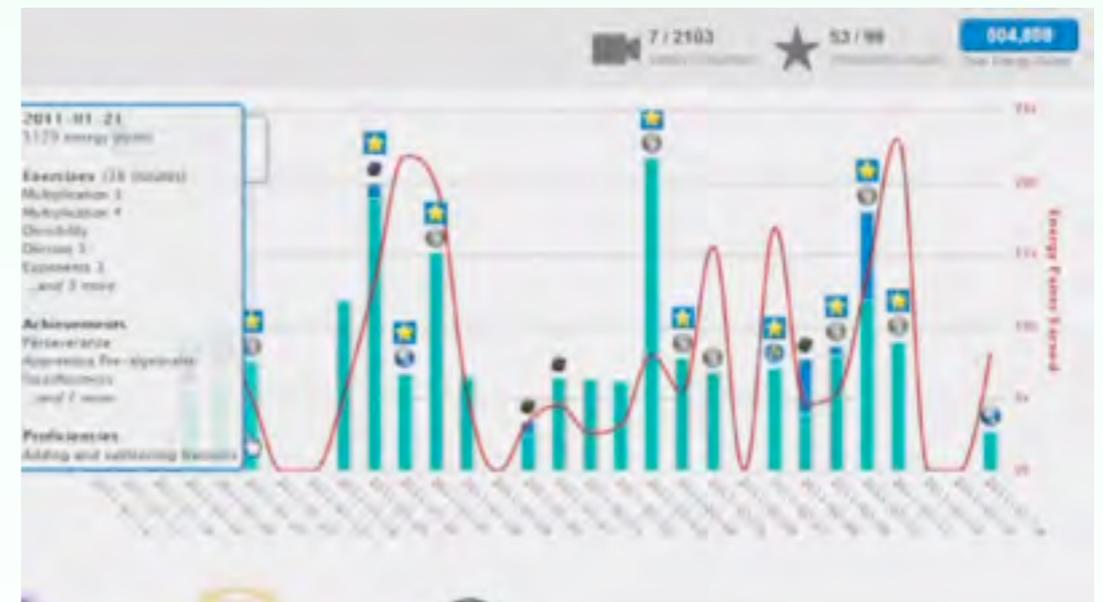
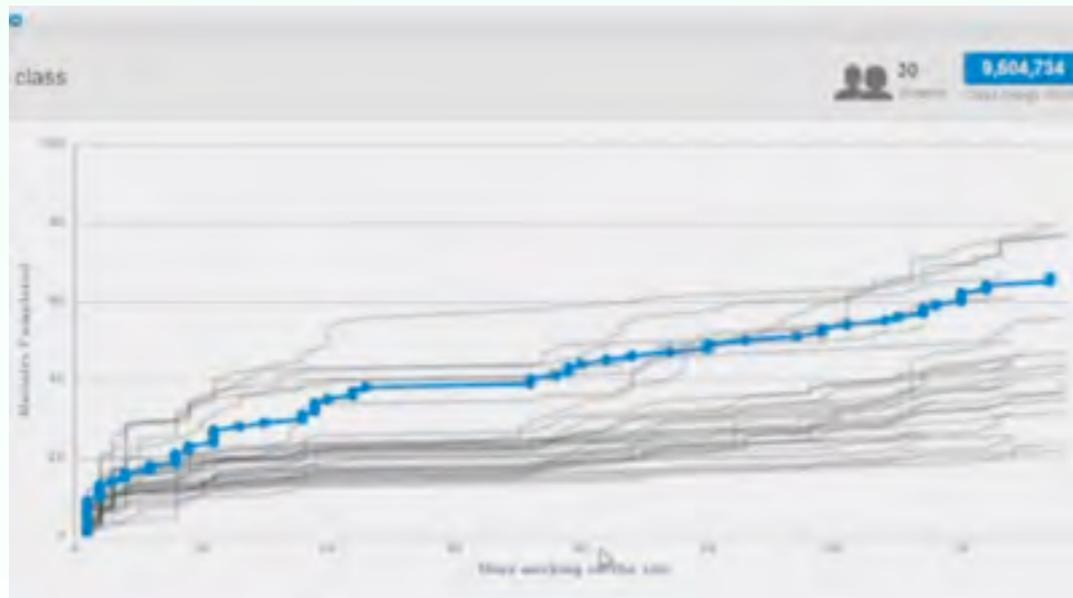
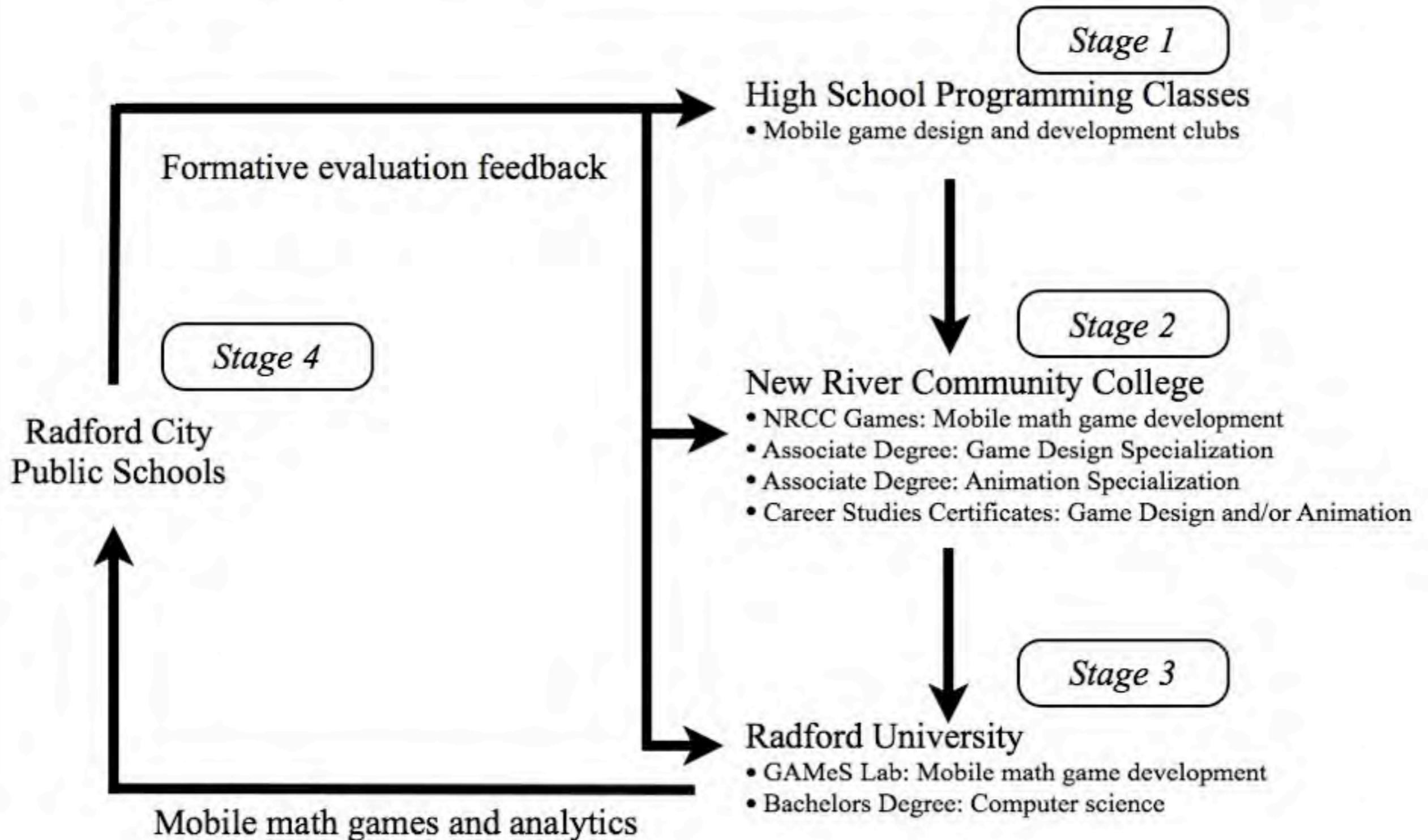


Photo Credit: Khan Academy

Grounded in Research

Customize and controlling characters and NPCs	Projective identity research (Gee, 2009)
Progression map	Motivation research (Malone and Lepper, 1987)
Instructional Design	Backward design (Wiggins & McTighe, 2006)
Feedback loops	Learning science (Bransford, Brown, & Cocking, 1999)
Gamification of learning	Efficacy meta-analyses (Hays, 2005)

Production and Preparation Partnership Pipeline



People and Products

GAMeS Lab

Dissemination Channel and
Recruitment Platform the
Commonwealth of Virginia and
Radford University

Collaborators and Partners

The Jamestown-Yorktown Foundation



Institute for Creativity, Arts and Technology



HARVARD
GRADUATE SCHOOL OF EDUCATION



Media Coverage of GAMeS Lab



Radford University professor named Innovative Educator of the Year

Posted December 15, 2011



Radford University Professor Matt Dunleavy has been awarded the Innovative Educator of the Year for 2011 by the Virginia Society for Technology in Education.

Dunleavy, an assistant professor of educational technology and director of the GAMeS (Games, Animation, Modeling and Simulation) Lab, received the honor from VSTE for his groundbreaking work in augmented reality and mobile learning.



FORMER TECHNOLOGY CHIEF TRIES OUT AUGMENTED REALITY AT RU

Aneesh Chopra strolled across the Radford University campus Wednesday evening holding a smartphone at arms' length. Chopra, former U.S. chief technology officer, was taking an augmented reality tour.

At each destination, Chopra and others on the brief walking tour, including RU President Penelope W. Kyle, were greeted with a video message from students providing important and fun information about the area of campus where they were standing.

"This is exciting stuff," Chopra said. "This is not what I thought I was coming to see."



RU alumnus Daniel Burgess, left, co-founder of the startup company MoGo Mobile, tours campus with Aneesh Chopra.

Seed Grant Finances a Research Powerhouse

Matt Dunleavy came to Radford University in 2007 from a post-doctoral fellowship at Harvard University. Immediately upon arriving, he was able to secure a \$20,000 seed grant from the Office of Sponsored Programs and Grants Management to develop mobile technology applications and curricula for elementary, middle and high school students. Since then, Dunleavy and his GAMeS Lab team in the College of Education and Human Development have transformed that grant into a \$2.2 million research and development program.

Kids hunt dinosaurs with smartphones, not spears

Virginia Tech hosted a digital DinoDig, letting kids see the world of dinosaurs through their smartphone screens.



classroom to improve education and what they



Montgomery County students seek to 'augment' reality

Posted June 16, 2012



MCPS summer enrichment participant Anup Pohharel tests a classmates' game on an iPhone Thursday. Several students built games using the augmented reality software, FreshAIR. Photo by Mike Shaw | The Burgs.

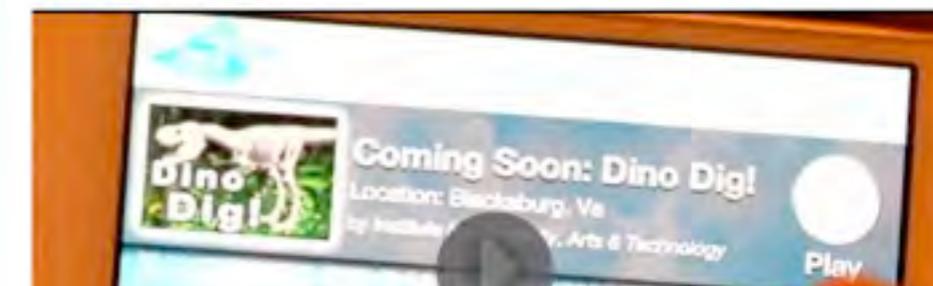
CHRISTIANSBURG — Several students in the Montgomery County Public School system have been using iPhones in class and during summer enrichment programs, but that doesn't bother Eastern Montgomery High School ecology teacher Josef Pociask.

That's because last semester Pociask's ecology class at EMHS was piloting a new technology using the phones called augmented reality. This week, more students could be seen experimenting with the technology during the school system's summer enrichment classes at Christiansburg Middle School.

Virginia Tech 'Dino Dig' on augmented reality app

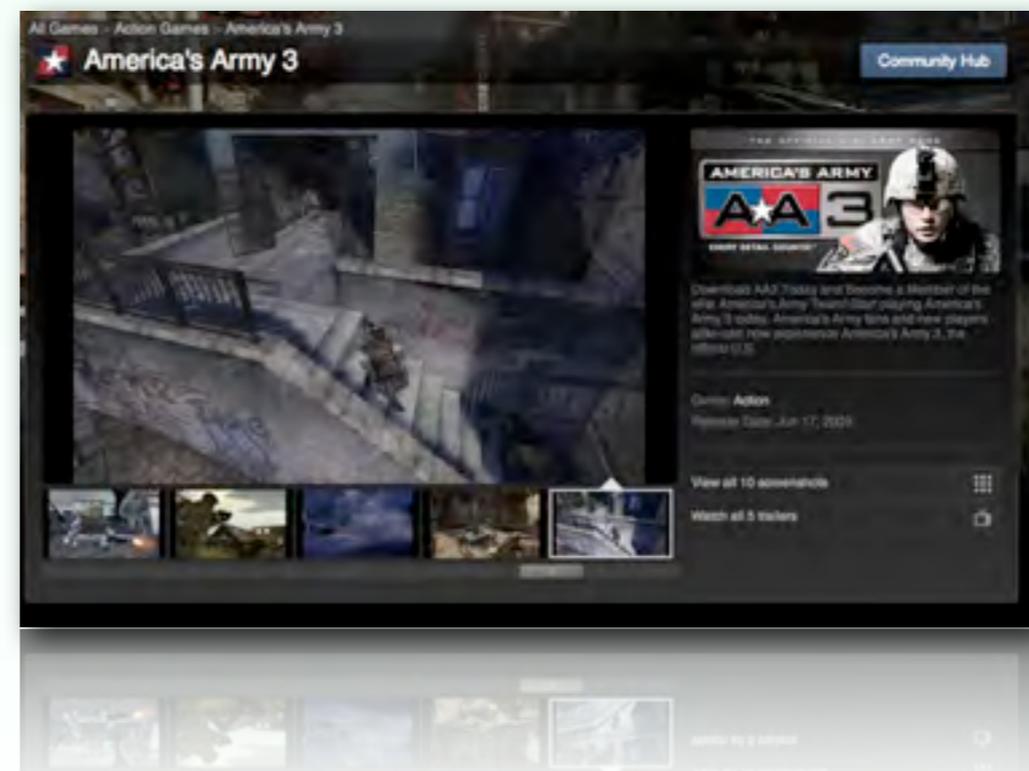
Recommend Be the first of your friends to recommend this.

Posted: Apr 19, 2013 8:52 PM EDT
Updated: Apr 20, 2013 12:54 PM EDT
By Katie Love, Reporter - email



Why is this relevant?

- Peer-reviewed meta-analyses have documented generalizable findings on the effectiveness of instructional games (Hays, 2005; Ke, 2009; Randel, Morris, Wetzel, & Whitehill, 1992; Sitzmann, 2011; Vogel, Vogel, Cannon-Bowers, Bowers, Muse, & Wright, 2006).
- Gamification or “using game techniques to make activities more engaging and fun” is being used to teach content ranging from poverty awareness to military operations (e.g., Heifer Village, America’s Army) (Kim, 2011).



Why is this relevant?

Learning platform of the future...

Home News Reviews Blogs Comparisons Top 10s User Guides Apps Features Ask Newsletter

APPLE BLACKBERRY GOOGLE HTC MOTOROLA NOKIA SAMSUNG SONY ALL MAKES SEARCH THE SITE

You are here: Home » Products » 5 billion smartphones will ship between now and 2016, says Qualcomm

5 billion smartphones will ship between now and 2016, says Qualcomm

NEWS | Richard Goodwin | 11:12, 19 Nov 2012



Chipmaker Qualcomm expects to see smartphone shipments rocket between now and 2016

Ultrabook™ means business.

TRENDING

- 1 Asus Memopad HD 7 UK price confirmed at £149
TABLETS
- 2 Xbox One: How Microsoft could've jump started Windows Phone
MICROSOFT
- 3 iPhone walk-in replacement policy set for axe as Apple look to cut costs?

Why is this relevant?

DFC Intelligence forecasts global video game sales to reach \$82 billion by 2017. Mobile gaming revenue is projected to reach \$12 billion by 2017.



Why is this relevant?

Preparing students for emerging economies...

The screenshot shows a news article on the Inside Mobile Apps website. The article is titled "Apple App Store has now paid out \$9B to developers" and is written by Emanuel Malberg. It reports that Apple has paid out \$9 billion to developers, with the App Store having earned a total of \$12.8 billion over its lifetime. The article also mentions that the App Store now hosts more than 850,000 iOS apps and 350,000 dedicated iPad apps. A large blue icon of the App Store logo is featured in the center of the article. To the right of the article, there is a sidebar with a "Tap for Tap" logo and a section titled "Social Media Jobs of the Day" listing three job openings: Social Media Manager at NY Daily News, 3D Game Engineer at KIXEYE, and Social Media Marketing Manager at Fandango.

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Apple App Store has now paid out \$9B to developers

Emanuel Malberg • May 23rd, 2013 | Apple featured

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Apple announced on its earnings call today that the Apple App Store has now paid out \$9 billion to developers. This means that the Apple App Store has earned a total of \$12.8 billion over its lifetime, with Apple earning \$3.8 billion from a 30 percent cut of sales. Apple also shared that \$4.5 billion of that amount was gained in the last four quarters alone. This means that Apple now pays developers over \$billion per quarter.



The Apple App Store, available in 155 countries, now hosts more than 850,000 iOS apps and 350,000 dedicated iPad apps, adding 50,000 apps since Apple's last reported figure from its earnings report in January.

The App Store, which exceeded 40 billion downloads in the last fiscal quarter, has now reached 45 billion downloads, meaning it now sees a staggering 800 app downloads per second.

Tap for Tap

Social Media Jobs of the Day

Social Media Manager
NY Daily News
New York, NY

3D Game Engineer
KIXEYE
San Francisco, CA

Social Media Marketing Manager
Fandango
Los Angeles, CA

See all jobs | Post a job

Why is this relevant?

Preparing students for emerging economies...



GAMES LAB RECOGNIZED BY SCHEV FOR INNOVATION

Radford University's Games, Animation, Modeling and Simulation (GAMeS) Lab was recognized Thursday by the [State Council of Higher Education for Virginia](#) (SCHEV) as an innovative program addressing the goals of the state's Higher Education Opportunity Act of 2011, known as the top-jobs act or TJ21.

Questions?



<http://gameslab.radford.edu/>



Photo Credit: HGSE EcoMOBILE, SITP