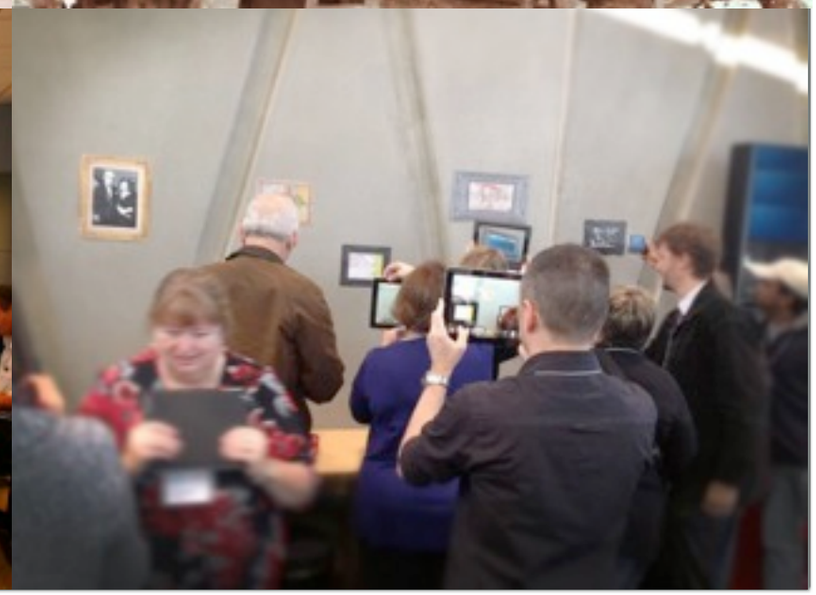


Creating opportunities for multimodal layered learning through Augmented Reality

Australian Government
Office for Learning and Teaching

THE AUSTRALIAN NATIONAL UNIVERSITY

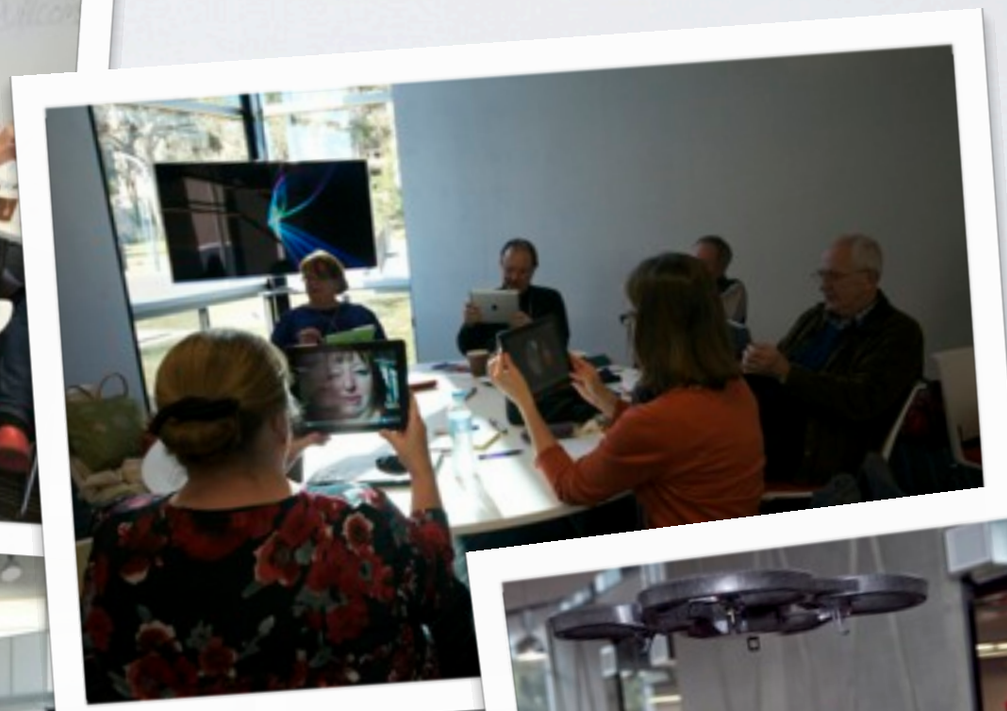
UNIVERSITY OF CANBERRA
AUSTRALIA'S CAPITAL UNIVERSITY

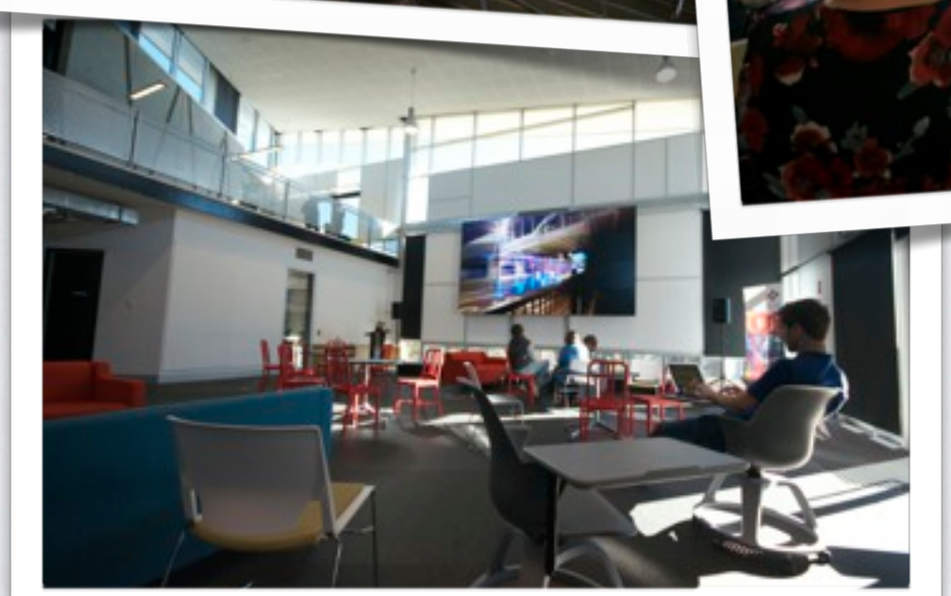
MACQUARIE UNIVERSITY

WHAT IS ARSTUDIO?

ARstudio is an Australian Government funded innovation and development project to identify effective uses of augmented reality in an educational context, together with tools for mapping its uptake and evaluating its effectiveness. This includes producing a collection of practice models, illustrating interactive, pedagogically-driven uses of augmented reality in common learning spaces.

- **ARstudio** - practice, skills, accessibility
- **ARchive** - case studies, models, guidelines, evaluation & frameworks
- **ARcamp** - community, sharing, ideation





"A collaborative environment to focus expertise, develop practice, provide resources and build capacity for effective implementation of AR technologies in education"

AR DEFINITIONS

"real-time views of a physical, real-world environment whose elements have been augmented, enhanced or enriched by computer-generated sensory input, such as sound or graphics."

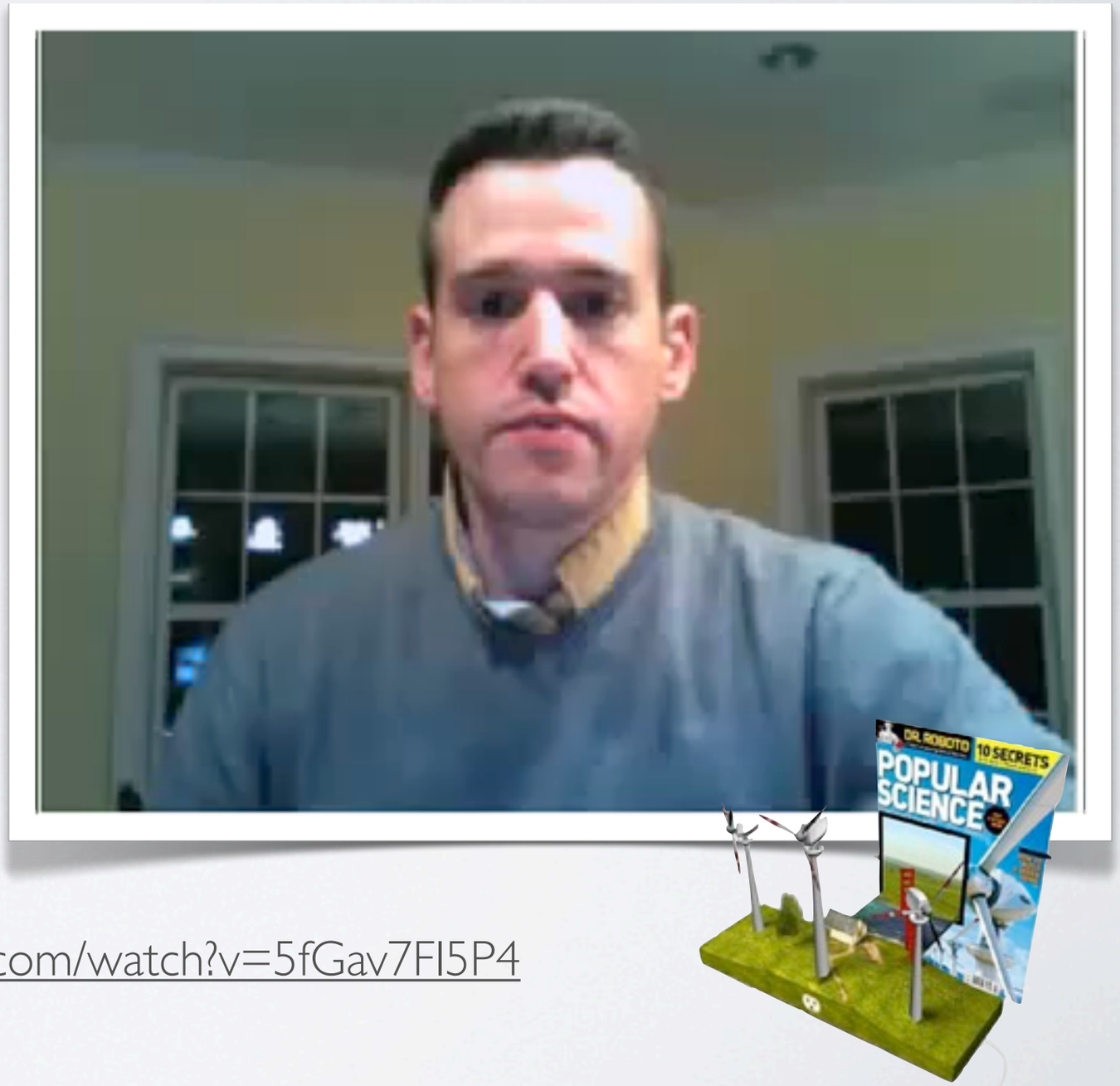
(Azuma, R. 1997)

"Augmented reality (AR) is a live, direct or indirect, view of a physical, real-world environment whose elements are augmented by computer-generated sensory input such as sound, video, graphics or GPS data."

(Wikipedia, 2012)

WHAT IS AR

- GE's Augmented Reality, Popular Science Magazine (Jun 2009)
- 1st interactive 3D magazine
- Fiducial markers
- Flash & ARToolkit



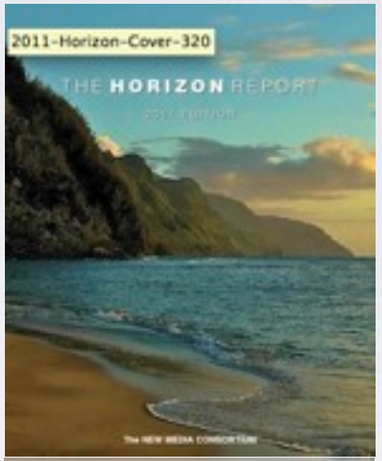
http://www.youtube.com/watch?v=5fGav7FI5P4

STUDIO

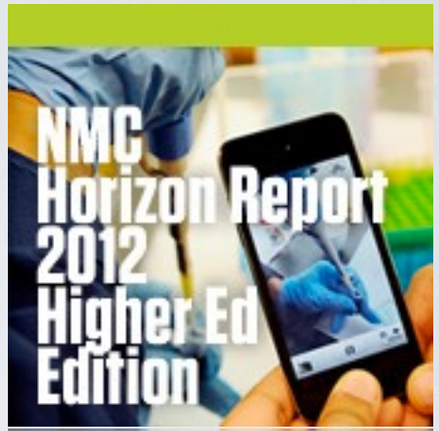
WHY AR? WHY NOW?

- **Horizon Report 2009**
  - Mobiles
  - Cloud computing
  - Geo-everything
  - The personal web
  - Semantic-aware computing
  - Smart objects

- **Horizon Report 2010**
  - Mobile Computing
  - Open content
  - Electronic books
  - Simple augmented reality
  - Gesture based computing
  - Visual data analysis

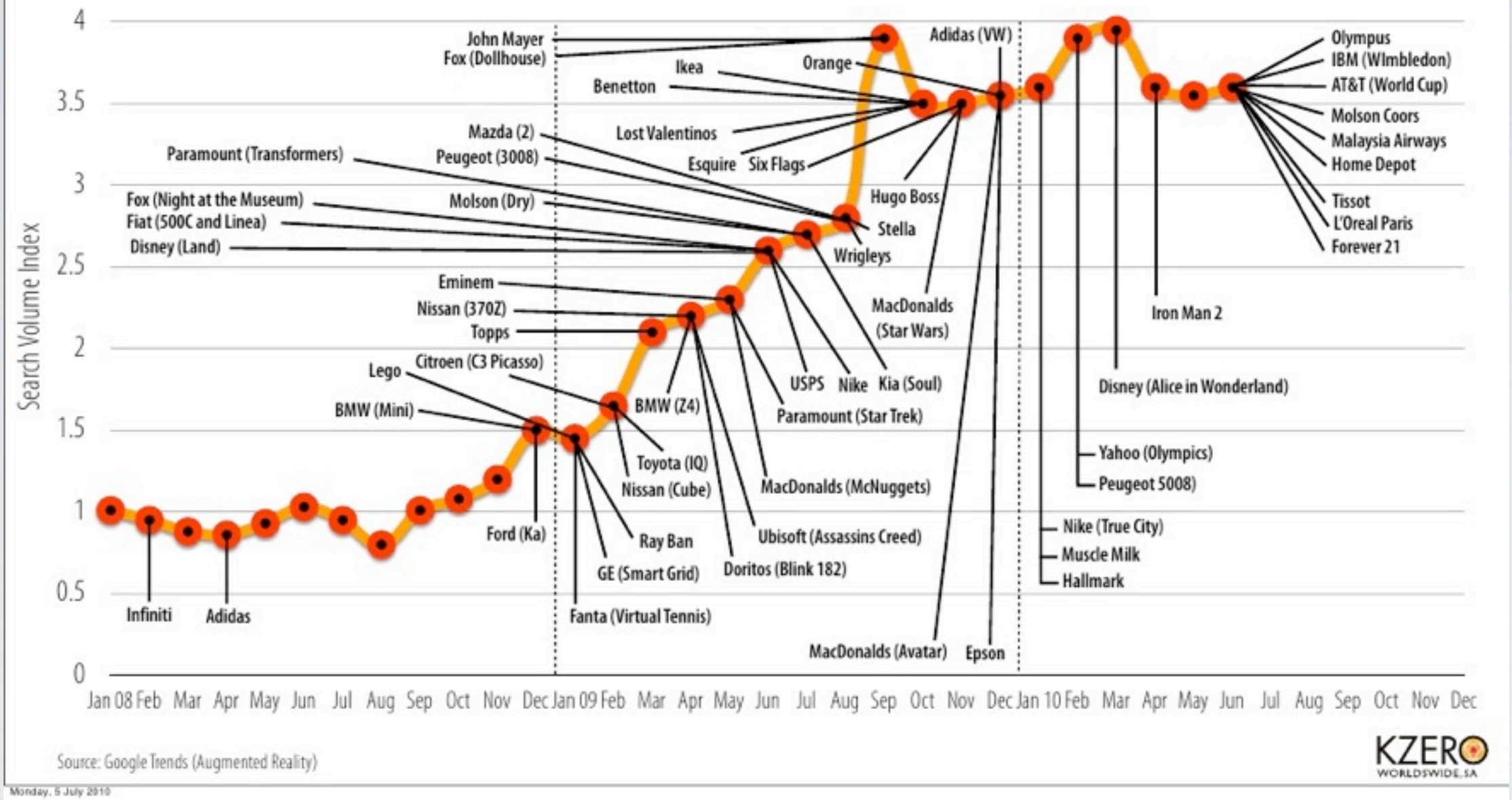


- **Horizon report 2011**
  - Electronic Books
  - Mobiles
  - Augmented Reality
  - Game Based Learning
  - Gesture based computing
  - Learning analytics



- **Horizon report 2012**
  - Mobile Apps
  - Tablet Computing
  - Game based learning
  - Learning Analytics
  - Gesture based learning
  - Internet of things

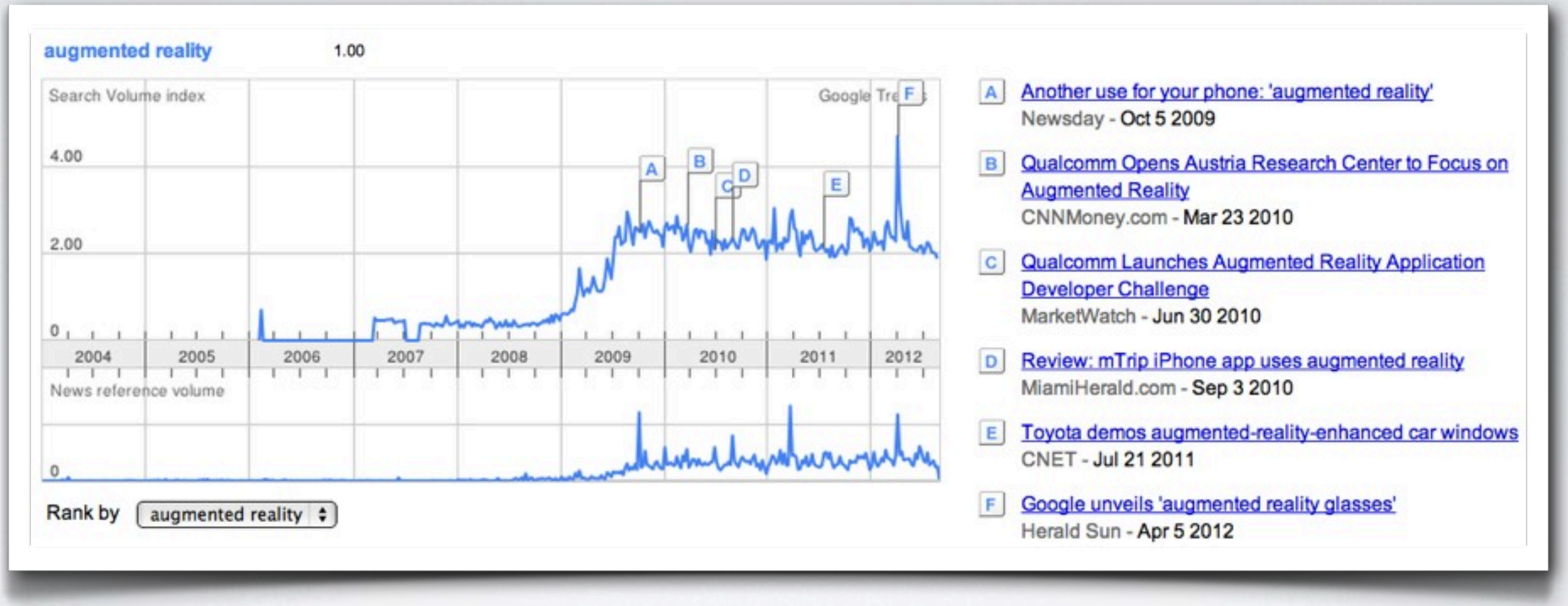
Brand Tracking: Augmented Reality



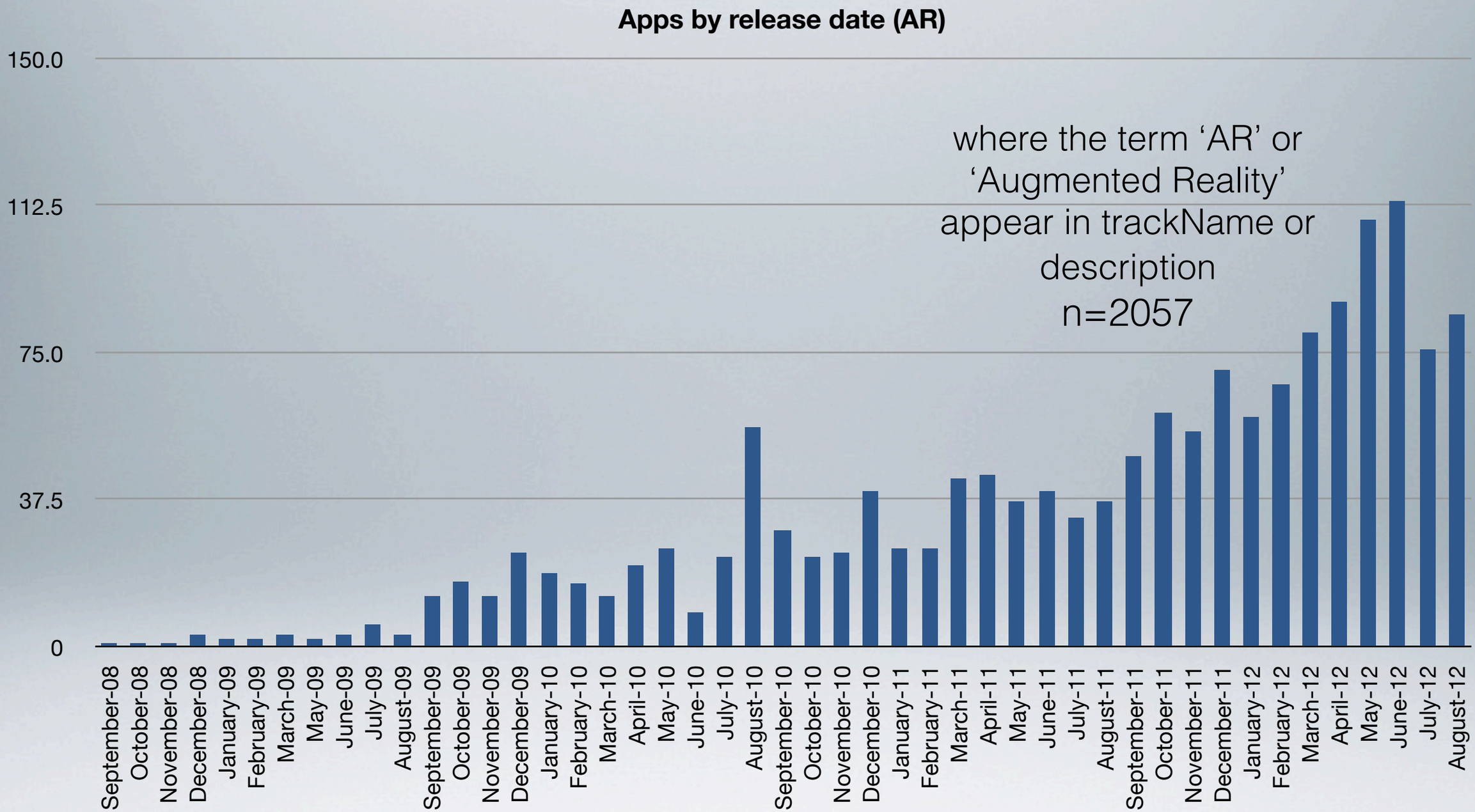
Source: Google Trends (Augmented Reality)

KZERO WORLDSWIDE.SA

GOOGLE TRENDS

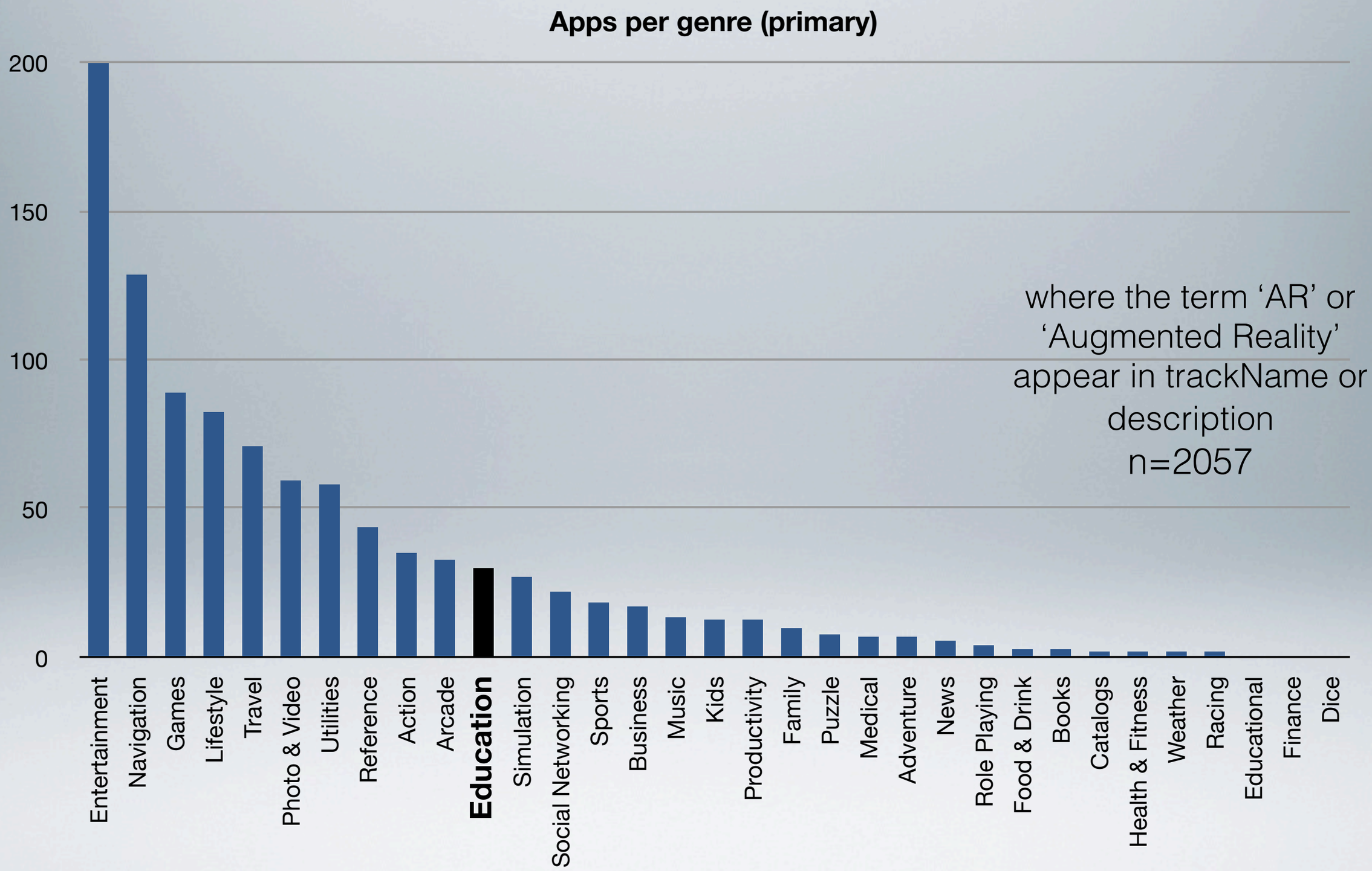


Augmented Reality 2004-12



Apps by release date on iTunes store

(Krix, P 2012) accessed 24/08/12



Apps ordered by genre on iTunes store

(Krix, P 2012) from iTunes store accessed 24/08/12

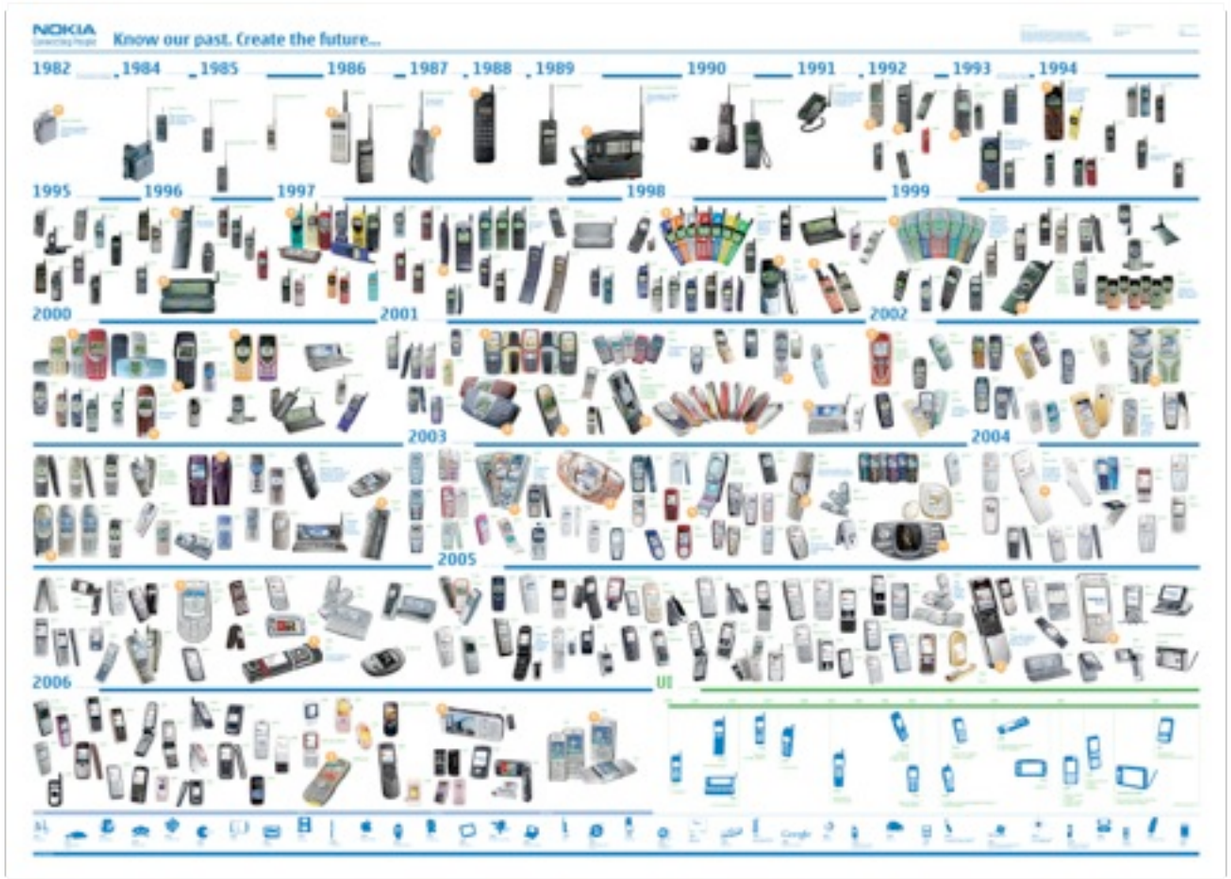
OPPORTUNITIES

'AR offers opportunities to expand our concept of learning spaces, to create new dimensions in mobile learning and to increase connectedness of learners in multiple contexts'

'learning can occur at a deeper level when pedagogy and content knowledge exist in context.'

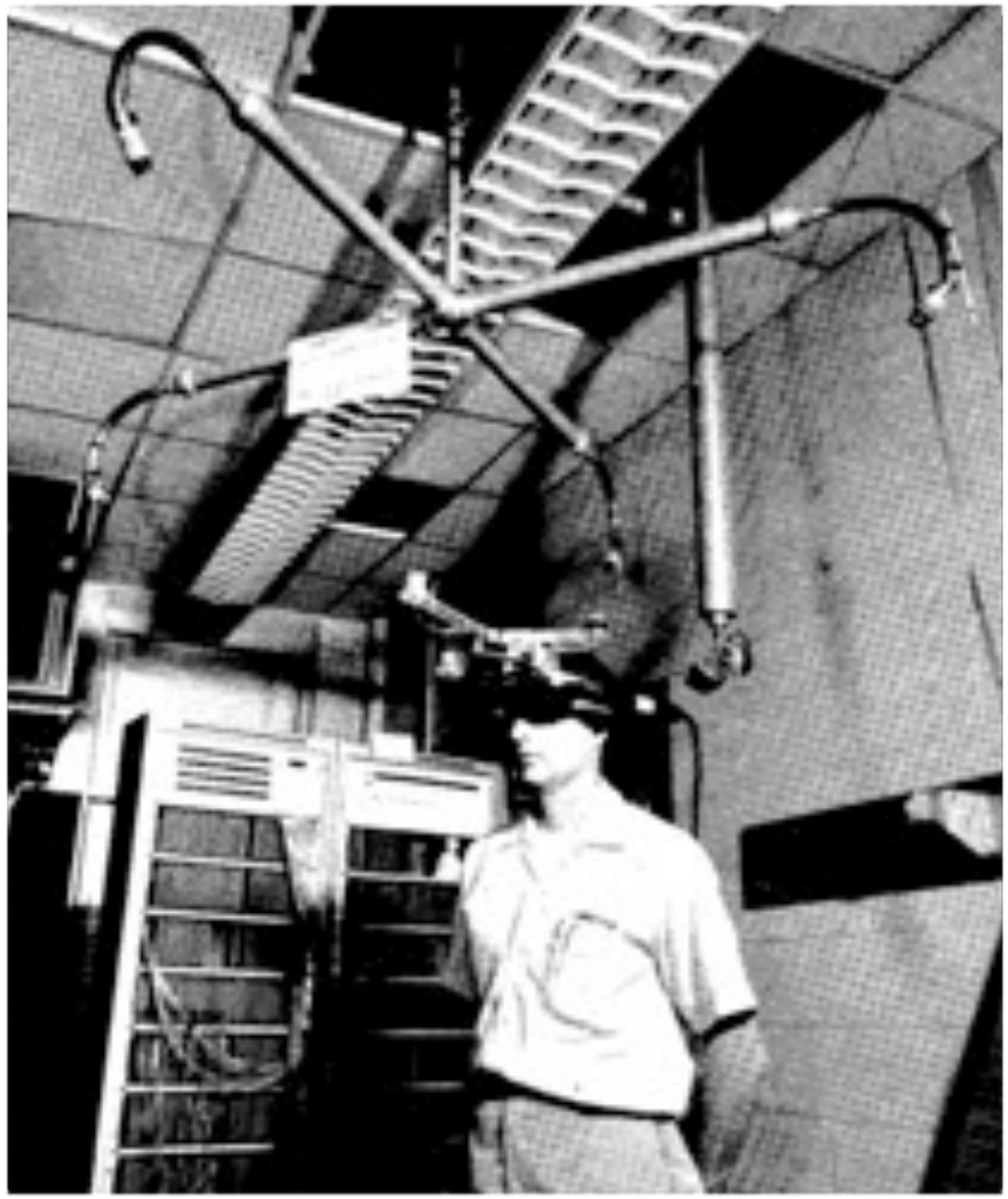
Miniaturisation

Mobile Evolution by Kyle Dean



Massification

Nokia timeline, (legacy map)



(Sutherland, I. 1968) A head-mounted three dimensional display. pg 757-764

Introducing . . .

sensorama

The Revolutionary Motion Picture System that takes you into another world with

- 3–D
- WIDE VISION
- MOTION
- COLOR
- STEREO-SOUND
- AROMAS
- WIND
- VIBRATIONS

PATENTED

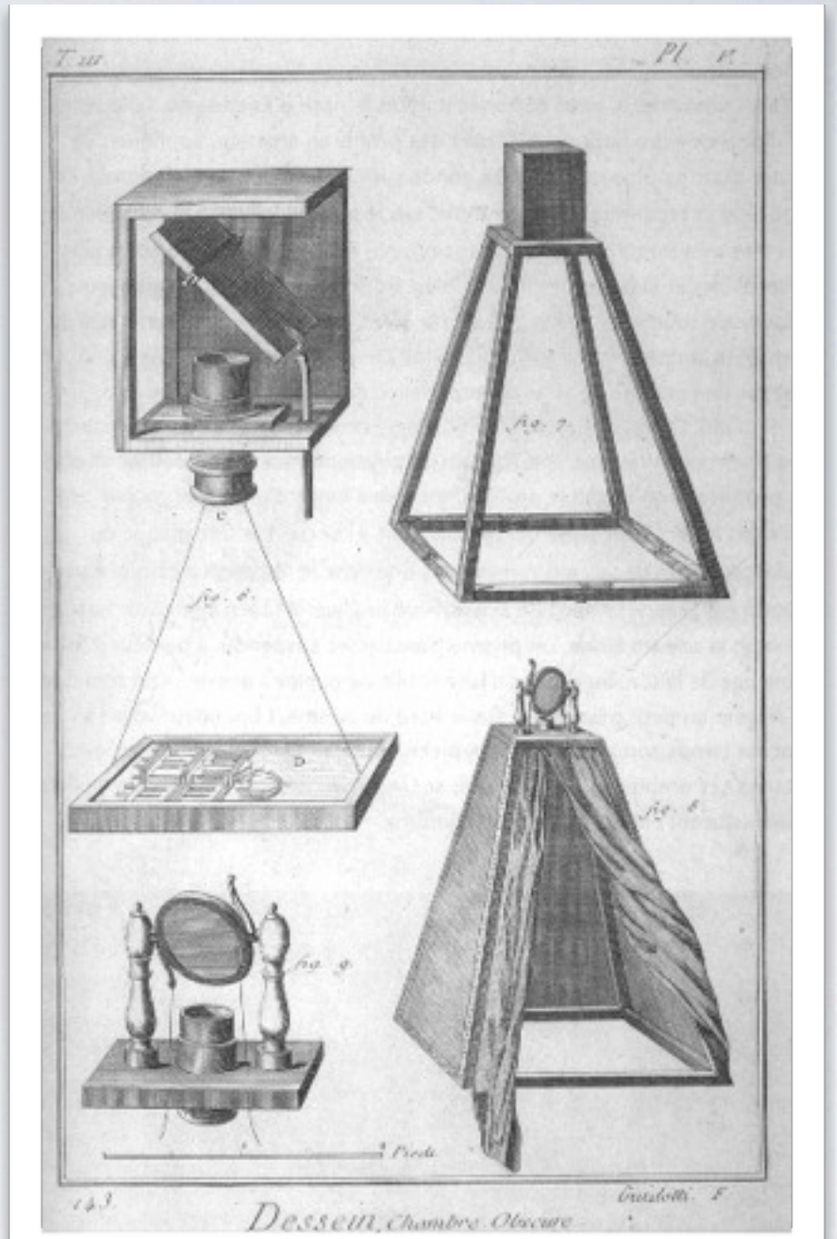
SENSORAMA, INC., 855 GALLOWAY ST., PACIFIC PALISADES, CALIF. 90272
TEL. (213) 459–2162

(Helig, M. 1962) The Sensorama, from U.S. Patent #3050870

Claude Glass, 1778

'the view could sell for 1000 pounds...if only one could fix the image!'

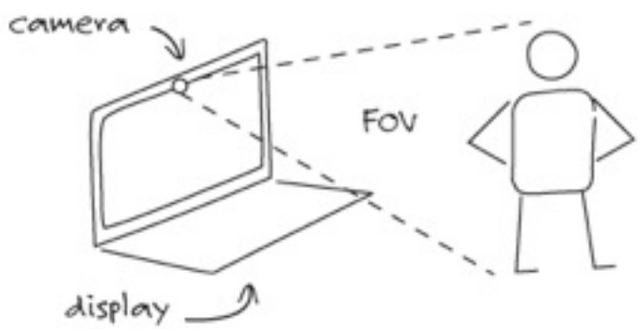
Thomas Gray (poet)



Camera Obscura,

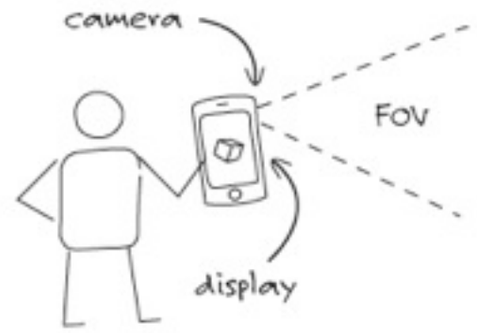
Aristotle to Daguerre, 384BC-1826

User experience of AR



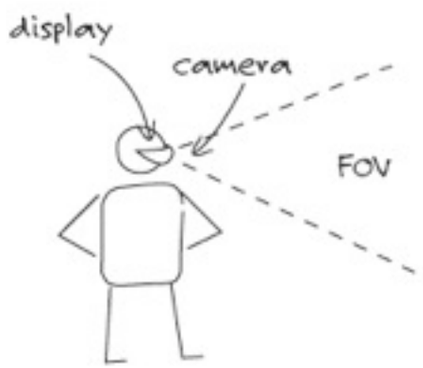
INTIMATE

- Whole body/upper torso in FOV
- Fewer spectators
- Wider distribution



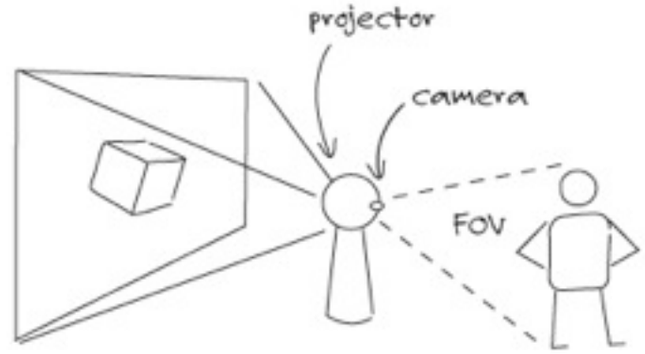
PERSONAL

- Only extremities or head in FOV
- 1-2 Participants
- Wide distribution & locations



PRIVATE

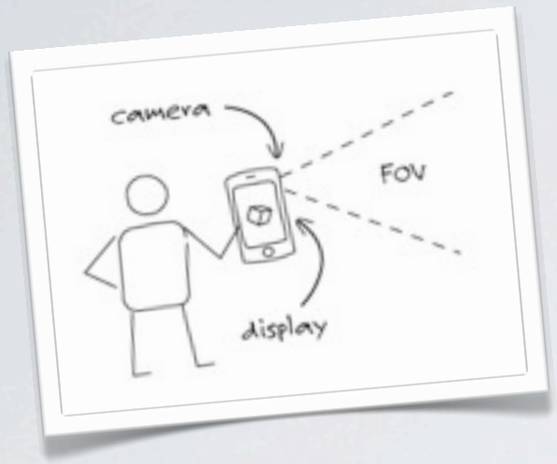
- Only extremities in FOV
- 1 Participant
- Currently almost zero installed base



PUBLIC

- Whole body in FOV
- More spectators
- Limited distribution

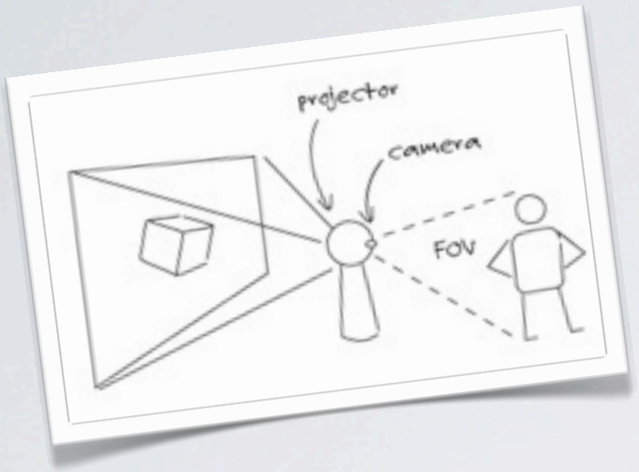
cc-by-sa ar-ux.com (Manson, R. 2012)



PERSONAL

- MOMA NYC Art Hijack
- 9th Oct 2010
- Geolocated
- Flash & ARToolkit

http://www.youtube.com/watch?v=b9T2LVM7ynM

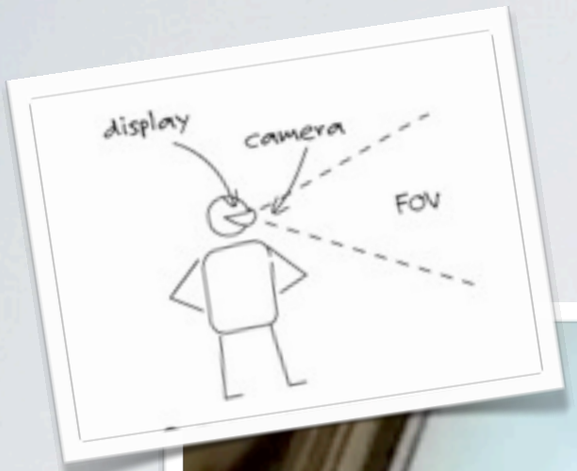


PUBLIC

- NSW Australia Tourism, Jul 2012

- Fiducial marker & Kinect

http://www.youtube.com/watch?v=UjW-CGJG8kE



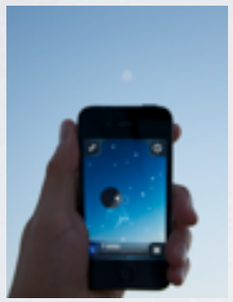
PRIVATE

Google glass project, April 2012

http://www.youtube.com/watch?v=9c6W4CCU9M4

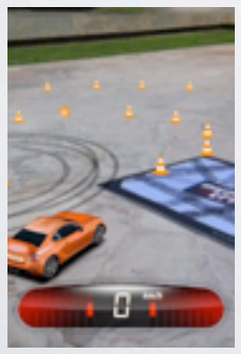
Live demo

ARstudio - Anna's story & prospectus, (theme:narrate)



SkyView & Transparent Earth, Plane Finder (theme: inform, reveal)

Theodolite (theme: reveal, simulate)

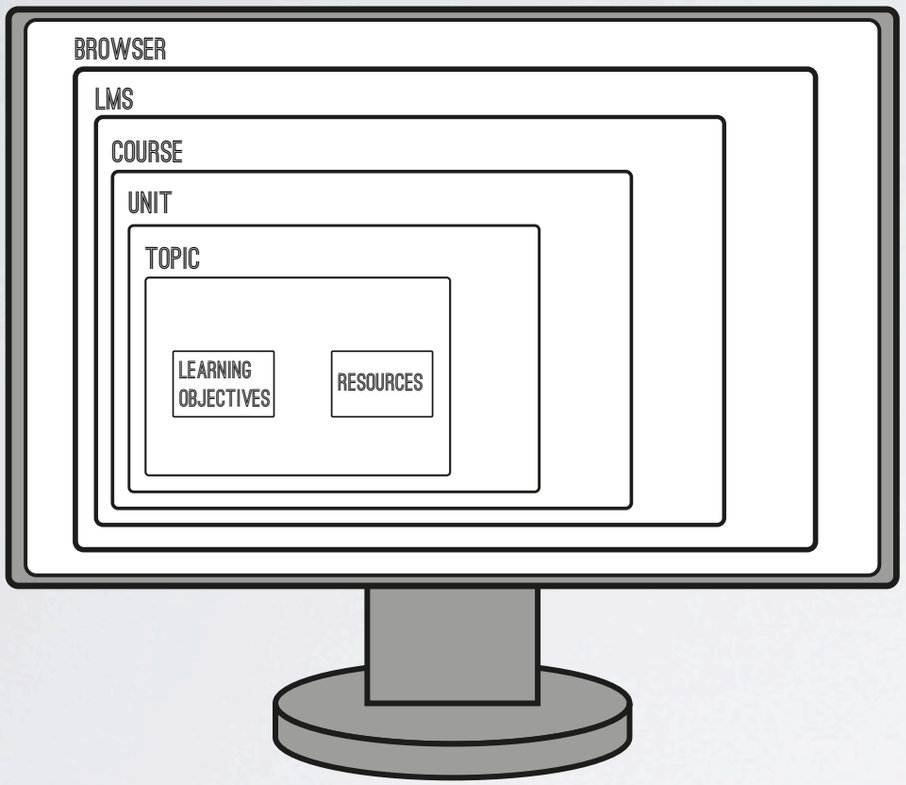


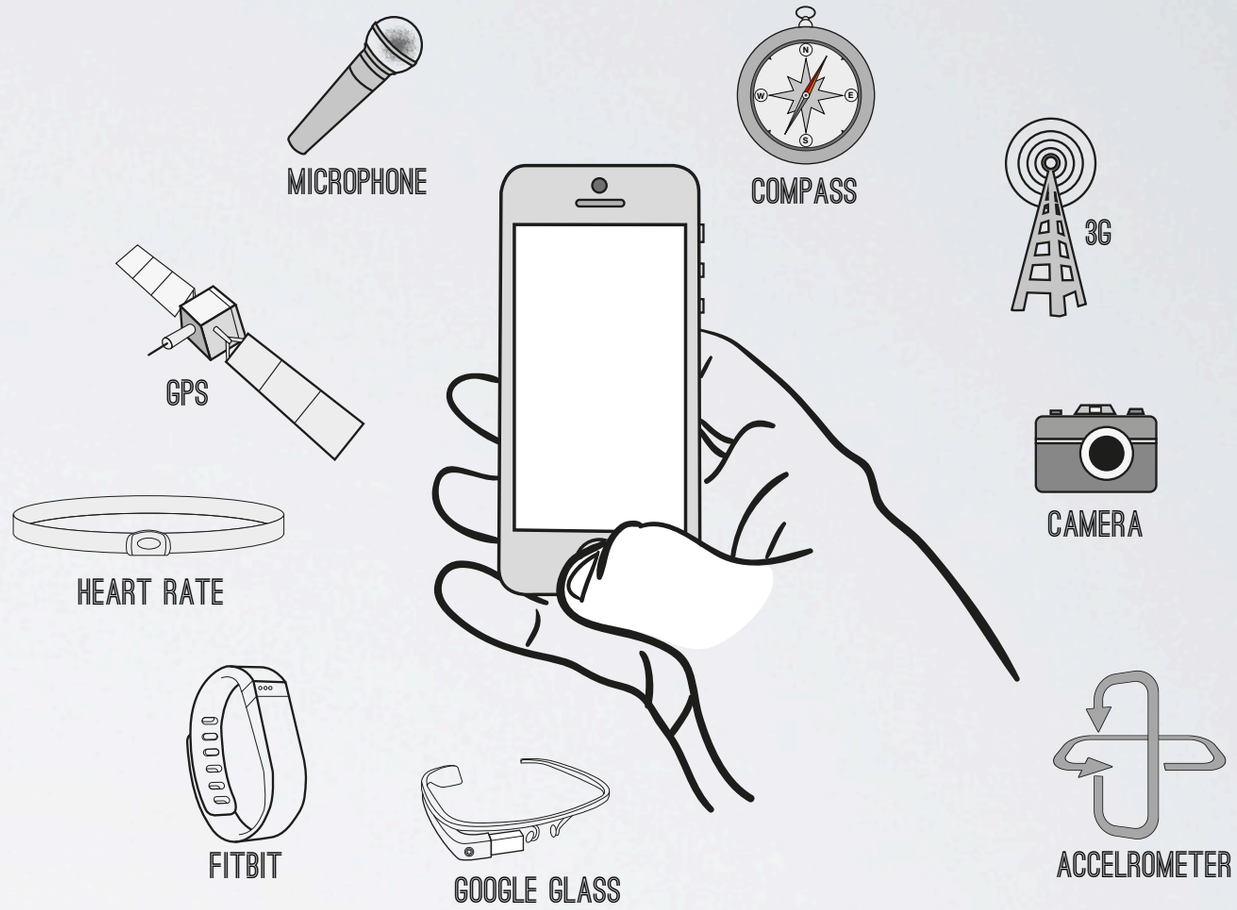
Londinium (theme: reveal)

OTHER APPS

Aurasma
AR studio
String
Spacecraft 3D
Toyota 86
Defend the earth
AR Basketball
Transparent Earth
Londinium
Plane Finder AR
Skinvaders
Theodolite ($)
Magic Plan
Wikitude
Google
Junaio

FUTURE OPPORTUNITIES





'AR offers opportunities to expand our concept of learning spaces, to create new dimensions in mobile learning and to increase connectedness of learners in multiple contexts'

‘learning can occur at a deeper level when pedagogy and content knowledge exist in context.'

WORKSHOP

Mini Design Challenge

Flipped research, innovation and development

Time Needed
10 minutes

Step 1
Discovery

Identify potential: 5mins

The aim of this process is to quickly identify and describe an existing activity that has the potential to be enhanced with Augmented Reality. Work through the following questions to guide your discovery.

TOP TIP: Sometimes it helps to choose a single person in your group, to act as the client.

What are three common questions asked by your students?

1 _____

2 _____

3 _____

What are three important things you want your students to understand, achieve or be able to do?

1 _____

2 _____

3 _____

Are there an objects or real world locations associated with your answers above? list below

_____

_____

_____

_____

_____

Step 2
Interpretation

Interpret needs: 5mins

Now search for meaning in what you just learned
We think there are 8 common themes, that describe how we use Augmented Reality (there might be more!)

Consider how the AR themes might be used in your scenario.

For at least one of your answers opposite, circle the words below that that you most strongly associate with it.

Analyze	Evaluate	Reveal
Annotate	Explain	Review
Apply	Extend	Organise
Collabor	Hijack	Promote
Combineate	Identify	Play
Compare	Illustrate	Question
Confront	Imagine	Recommend
Create	Inform	Remember
Critique	Invent	Search
Differentiate	Judge	Share
Educate	Juxtapose	Solve
Engage	Locate	Summarize
Entertain	Match	Understand

Other....

_____

_____

devised from 'Design Thinking for Educators' at IDEO.com

WORKSHOP

Mini Design Challenge

Flipped research, innovation and development

Time Needed
10 minutes

Step 3
Prototype

One BIG idea: 10 minutes

For this mini design chalenge we will focus on just one idea. Choose one that has great potential and scale it up.
You will have 1 min to share your idea with the rest of the group. This is competitive and there are prizes:)

devised from 'Design Thinking for Educators' at IDEO.com