

Research Park Mobile Development Day 2015 Notes

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John Deere, Julian Sanchez

History lessons on tech adoption

- First Motorola cell phone in 1983
- IBM Simon in 1994 with first email capability, touchscreen, too early
- Nokia 1998, price point disruption, could put in your pocket
- 2002: cameras on phone, think about what it could do, now fuels social media
- 2014: 2 trillion pictures taken annually on phones
- 2005: embedded systems and features as the battle
- 2007: the iPhone introduced, easy battle

Next frontier: personal health, connected experience in care

Aviation has lots of opportunity → iPads in cockpits, connected ecosystem next

John Deere innovates mobile for agriculture ecosystem

- Apps in tractors to predict weather, configure and setup equipment
- Decision making via mobile: when should I plant? When should I spray? How deep should I till?

Mobile strategy key tenants

- Commitment to mobile: no mobile, mobile random, mobile niche, mobile augment, mobile first, to mobile only. Do you understand your customers well enough to choose where you are?
 - Example: the change with Facebook in being mobile first because of the users becoming more mobile than desktop → flipped their development
 - Easier for startups to make this shift, ag startups starting with mobile
 - Mobile augment: for example with banks, some services via mobile only
 - Mobile niche: excel in some areas with mobile
 - Automotive: mobile random, only some cars integrate with phones, not fully functional
- I have this great idea for an app! Be careful with this, not every idea is worth pursuing and everyone thinks they have a mobile moment. The “happy hippy” idea needs the “skeptical cat” to check them within a large organization.
 - Will the app replace something that already works? How is it better, easier? Or does it create a new functionality
 - How does it fit in the ecosystem of your business? Lots of apps that do specific things. A website does lots of things, an app may not. Jump from app to app with context.
- Key strategy
 - User Experience framework, need a visual and how user will use, helps skeptics. Have consistent look and feel for your brand in all your apps.
 - Skeptical cat: hears ideas, but also challenges them, has conversations and leans toward yes typically (i.e. not a compliance person)
 - Mobile software architect – not a police officer

Purpose of wearables: Needs to be useful, not just silly → Google Glass is example of too much too fast; watches will get us comfortable with wearables

Android Trends: Google Developer Expert, Freelance Android Developer

- Material Design: Google new design language, an underlying system to have a unified experience across platforms and device sizes.
 - Evolution of responsive design because people use multiple platforms
 - Optimize design for familiarity

- Material is the metaphor: grounded in tactile reality, inspired by paper and ink, open to imagination and magic, surfaces and edges provide cues
- Bold, graphic, and intentional: visual foundation of print design (think magazine layout), create hierarchy to guide users and create focus, immerse in the user experience
- Motion Provides Meaning: user is prime mover (not flash for movement pizzazz), single environment, focus attention, provider continuity. Convey motion with animation.
- Google developer toolkits can help as a guide, appcompat helps with conversion
- Android Everywhere with a unified experience: wearables, smartphones, tablets, on TV (Chromecast), cars
 - Don't create a separate app for each platform, it's all a different view of the same data
 - Use the strengths of each platform for different purposes. Capable within development tools to have auxiliary services vs. new apps.
 - Nest and IoT integration: Nest is running independently at Google, new Nest API allows auto integration as an example (knows when you are coming home).
- New Interactions: full touch (smartphone and tablet), d-pad (controlling TV), swipe and tap (watch), brevity (car), voice input could work with any of these and should help experience
- Content Responsibility
 - Past: user opens app when information is needed or valuable, vs. contextual awareness that is more continuous and relevant
 - Present: app provides information when its valuable, location - time – context aware. For example: When you are watching a movie, your IMDB app tells you more about the actors. Recommendation engine based on what you watch.
- 2015 Trends: material design unified across platforms, multi-screen, voice interaction, contextual awareness

Apple iOS Development: Jason Bruder

- 1 billion iOS devices sold in 8 years
- AppStore, 75 billion unique app downloads, \$20 billion paid to developers from apps
- X code, SDK, iOS 8
- Mac and iOS devices are already well integrated, allows more compatibility
- iOS 8 has new key features, such as text messages from Mac to phone
 - Touch ID: authenticates user before accessing content in your app
 - Apple Pay: gives users an easy, secure, and private way to pay for physical goods
 - iBeacons: low powered low-cost transmitters, micro location awareness. Indoor positioning allows each building to have its own radio fingerprint for indoor directions like Apple Maps. iBeacons do not work yet, requires building owners to provide input. Upload blueprints, fingerprints in rooms, then app developers can use indoor directions.
 - PhotoKit
 - HealthKit: user option to share health information, example does exercise during the day help to go to sleep at night?
 - HomeKit: control appliances with compatibility across brands
 - CloudKit
 - Handoff
 - ScenceKit
 - SpriteKit
 - Metal
 - WatchKit: Xcode 6.2 with iOS 8.2 SDK beta pre-release is available with a simulator

- Developer.apple.com is the starting place for all new Apple apps. WWDC is the annual Apple Worldwide Developers' Conference. 1 ticket for every 20 developers that want to go (they have a lottery to get tickets)
- Swift is a new development language, objective C is hard to work with
 - Swift was built by a UIUC alumnus, Chris Lautner
 - iTunes U has a Stanford online free class on Swift
 - Swift playground interprets a compiled language, allows to quickly test ideas

Mobile Growth Drives Production and Consumption of Big Data

- Big Data Integration Data and Big Data Transaction Data lead to Big Data Processing
- Mobile apps drive business that generate data, then create analytical insight from data for new functionality, which leads to new better apps and improvement from competition

State Farm, Research Manager is an actuary that works on pricing

- Pricing for insurance is based on data analytics, predictive analytics improved with mobile. Getting much more granular data.
- 45 million auto policies, with major big data observations
- State Farm Mobile Apps: they were an early mover
 - Steer Clear for drivers under age of 25, discount program with education
 - Pocket Agent: find an agent and interact with them
 - Move Tools
 - Driver Feedback App: scores your driving and gives you tips to help drive better. Partner with auto industry for autonomous vehicles input.
 - Car Capture: when purchasing a car, get insurance information
 - Drive Safe and Save Mobile, just launched in 2015 in Ohio
- Drive Safe and Save
 - Mileage only
 - InDrive tells you analysis of turns and moves
 - Mobile telematics provides 15 points of information per second of driving
 - Partner with Verizon on data, so they avoid some privacy and legal subpoenas
- The intersection of big data and mobile
- Challenges
 - Different types of phones
 - Sheer volume of data: how much do they need, what do they store?
 - How to translate to meaningful results, what correlates to accidents accurately
 - How changes in the app affect the data
- What's next? IoT for home telematics, using Hadoop for analytics, ADT partnership already that customers can opt to provide home information

Grainger Mobile Apps

- First launched app in 2011, tablet app in 2013
- Content delivery: Need a better way to take all the information from their huge catalog and make it is accessible from a mobile device
- Ecommerce delivery: how to improve order processing
- Approve orders from technicians remotely as a manager for faster purchasing
- Live chat with technical experts

- Location services within a facility to have GPS inside and know which parts are needed in each location based on prior location purchasing history, location aware applications and ordering. Use iBeacons to help with this for example in a very large factory.
- Grainger ranked #2 in ecommerce performance app
- Speed is the most critical for customers

Caterpillar: Mobility and Big Data

- Mobile devices, anything mobile with connected capability, equipment with telematics, phones, and Wi-Fi enabled devices allow continuous data. Equipment is generating a lot of data; mining equipment has 5-200 samples per second: fuel burn, GPS data, and sensor information. Store on Sim cards for predictive information. Hard to collect information on mine sites that are very remote.
- Generator of data, processor of data, distributor of data = making phones network hubs
- How much processing capability do you have on your phone determines capability
- Dealer relationship with apps is complicated with their own CRM apps; Caterpillar provides them some tools they can use. Want to have a Cat App Store that dealers can use. Help dealers with predictive sales information.
- Preventive maintenance is a good value to the end customers/users

Zero Percent, preventing food waste, Rajesh Karmani

- Behind every app there is a story
- In 2011 Rajesh was a PhD CS student at UIUC
- 30-40% of food is wasted in the US, inspired by a book; \$22 Billion of good food is wasted annually. 1 in 6 Americans face hunger every day, food pantries struggle to keep up with demand. These two things seemed to Rajesh to be a solution to each other.
- First thought of a Groupon type of discount on food that would be wasted at restaurants
 - Real-time deals did not work
 - But, lots of people in the community were excited and passionate about the idea
- Pilot idea came from Einstein's in Urbana, where they wanted to donate food to the pantries, but could not get it to work as a schedule and operational function.
 - Created a simple donation app to offer food to 6 charities on a rolling basis, through simple auto-texting sequence, used AWS cloud services. Understood that the restaurant could use the app, but the volunteers preferred text messages. "Dial tree". Then signed up a caterer, Strawberry Fields, and others locally. Still done like this in Champaign.
 - Used PhoneGap to develop
 - Zero Percent was located at EnterpriseWorks incubator
- In 2013 a national non-profit reached out to them after seeing them in [Washington Post article](#). Expanded their application to Seattle, Denver, Phoenix, Dublin, and Orlando. Wanted to license it.
- Rajesh wanted to started a new bigger company and keep the technology, applied to Impact Engine in Chicago for the first class. Found out about it from an email at EnterpriseWorks. They had 300 applicants for the first class of 8 startups. Impact Engine accelerator was founded by the founder of OpenTable.
- They had no connections in Chicago with charities or restaurants. Started to cold call them. Signed up 3-4 charities. Sopraffina was the first restaurant to sign-up. Did not work the same with volunteers in Champaign.

- New solution: identify food able to be donated, pack and set aside, pick up at a pre-scheduled convenient time. Wanted to create a new MVP with geographic interface.
- Raised \$200K investment from angels in Chicago.
- New value for restaurants was creating value from the tax donations = cost + half “lost” profits
 - Enhanced tax deduction, is value proposition that has restaurants pay Zero Percent
- 421,000 meals have now been donated this way, with a 98% pick-up rate
- Featured in national press
- Users: all 7 dining hall at UIUC for 2 years, Hannah’s Bretzel, Eataly, Signature Room, Lou Malanati’s, Yolk = 70 restaurants
- 40 non-profits are now using Zero Percent, getting better quality food, more nutrition to clients
- Citylights ITA Trailblazer Award in 2013 in Chicago
- Now have a custom Goose Island Zero Percent beer
- New pilot with Uber Chicago, 1 day food rescue pilot. Test matching and moving. Deliver within 2 hours, move prepared food. Micro-scale enabling platform. No warehouse needed.
- UIUC has donated 15,000 pounds of food through the app
- @zeropercent

User Experience Design

Agribile: Tim Kuehlhorn

- Morning Farm Report sells to farmers with farming analytics, data heavy
- Pocket Rain Gauge, fee app to build a farmer relationship - rain gauge without using plastic tubes, all locations
- Understand the technical cost of each feature when deciding when to include, easy wins
- Visualize through sketches before you build the wrong thing, also do technical prototype before you build out entirely
- Most farmers are over 55, different relationship with technology, need to translate the benefit.
- Just showing graphs and trends doesn’t mean something to everyone, might need to translate into what it means and how it can be used.
- More tools like “Rest” to translate data to mobile and algorithms

Pixo, User Experience, Melinda Miller and Jonathan Pearce

- Background: User stories, observing and interviewing, ideating, sketching, usability testing. Transitioned from journalism to UX.
- UX Champaign-Urbana Meet Up meets once a month locally. Good community of support. Sometimes it’s a therapy session to be with others. Book recommendation: “UX team of One”
- Jonathan Pearce, Pixo product design, ease of use @jonpearceUX
- Wireframes to start a project, one sentence user stories to translate to features, need a timeline to drive the project and all the responsibilities and goals
- Be ready to throw out ideas if they do not work, be agile and not wed to a toolset
- Do a usability test, watch users and see how they function, where are the pitfalls
- Gamestorming activity to prioritize features and work, get voices involved

Ryan Harter: Google Android Development Expert

- Identify features, but need to limit, what is the core? Editing what is fundamental
- Framer GS is good for building prototypes, get in hands of customers to try
- Sometimes you are a one-man band, get outside input, don’t get tunnel vision. Put on the different hats you would where if you were the product owner, developer, UX lead. Know when you need to outsource.

- Google Ventures Startup Sprint is a good exercise, chart value vs. effort to prioritize, <http://www.fastcodesign.com/1672887/how-to-conduct-your-own-google-design-sprint>

Corporate Mobile Strategies

ADM Mobile App: Sam Bright

- Sam Bright is Vice President of Information Technology at ADM Crop Risk Services (CRS).
- ADM CRS set out to design a software platform that exceeded anything already on the market and integrated mobile capabilities to be used in the field. The new software allows ADM CRS adjusters to use their smartphones to map damaged areas, take photos, and prepare and submit claims while still in the fields adjusting a loss. Insurance agents are now able to fill out, sign, and send paperwork to the ADM CRS Underwriting Team electronically—further speeding up the process.
- The end result was a more accurate and efficient tool for adjusters that translated to real savings. The technology created \$163.20 in savings per claim and improves the turnaround time on claims by 60 percent when compared to reporting and adjusting claims on paper. Saving money for the company helps prioritize the mobile application development.
- Additionally his team created new smartphone capabilities for customer services, such as text message updates on futures and ADM FarmerView application with pricing updates, weather forecasts, location bids.
- Know your audience, 60% of target farm audience uses iOS devices, native is better in that situation. Did research with Gartner to help make decisions.
- Hybrid model, HTML 5 and .net libraries and work with iOS, heavy in native currently
- First they did the app for insurance agents, but built upon the app to offer a mobile app for producers that emulates what they used to on paper and integrates with adjuster formats. UI consistency is important.
- Embedded in CRS business team: understand the customers, go ride tractors and know what is needed, and be predictive and preemptive.
- Listen to others to learn from their business experiences and don't repeat mistakes, attend Gartner annual CIO event or others to learn
- Started in 2008 creating their own mobile app development, have become additional tools to get out of their overall software products, mobile-friendly is sometimes more appropriate than putting everything on mobile.
- Trying to do lots of team building to make the employees happy and improve retention and enthusiasm. Need to have internal champions, be a part of what is going on. Have lots of energy to keep having new products every 4 months.

Abbvie

- Pharmaceutical business is heavily regulated industry and hard to deliver applications
- Internal people at the company can get apps for decision making, show the problem and data
- Public facing applications are native applications, allow patients to be interactive and report symptoms, consumers are demanding
- Diversity of designs, but depends on target audience. Keep in mind if you are designing something for people in pain for example. Healthcare professionals need everything to be very quick and simple.
- Use KPIs for measurement, number of downloads, marketing to drive usage such as CRM targeting, social media listening for feedback

- Zepro is a mobile application that automates dose calculations, information on injection dose
- 4 days ago the FDA approved some customer health information sharing with new personalized diagnostics. Evolution is vital.

John Deere: Eric Crawford

- Eric took the UI Research Park mobile class while living in Carbondale and traveling here. Then got a job at Deere as an app developer.
- GoApps for tractors, talk to machines to better use the equipment
- Do C++ code, but customize UI for the device
- Native apps mostly at Deere because when they relied on 3rd party platforms you are at risk for them to go out of business
- Sometimes hard to get feedback from customers
- Students are mostly doing software development
- Most of their mobile interns come through the Research Park for Android and iOS developers, 80-90% of them are qualified. Get applicants every semester.

Caterpillar: Mobile Development Team

- Dealer and customer interaction
- Workforce in the office and worksite where mobility can help
- Cross platform needs, bring your own office, lots of dashboard information and iPad use cases
- Agile development for iterative development

Wearables Panel

Rithmio: physical activity recognition and gesture recognition

- Health and wellness, gaming, human-computer interaction
- Software as a platform, embed in devices, dev kit for Android
- Accurate solutions for movement data for health tracking, concerns with security too
- Use case when you don't want someone to have to take their eyes off something to request assistance, gestures might be able to assist. Can also quantify worksite tasks, too much heavy lifting or incorrect movements that can cause injuries.
- Price is still an inhibiting factor
- MEMS hardware is capable of measurement, but picking out information from noisy sensor data, finding the action you are looking for in a noisy clutter. Hard to make sense of it.
- Augmented reality for field use or gaming only, not mass public

Caterpillar:

- Gino interned at State Farm in the Research Park, then joined Caterpillar
- Wearables: VR headsets, Google Glass, smart watches, Fitbit

John Deere:

- Hearing aid as a wearable with a clear use case, long battery life, Bluetooth enabled
- Keith Bujak: Renssealer Polytech for engineering, then Teach for America, AIR, Johns Hopkins, GA Tech PhD in Human Factors, then joined John Deere in Research Park in May 2013
- Interested in wearables at Deere: GoApps give you quick access to information, gloves are on and hands in use on the farm → need a different interface such as wearable watch that gives you visual information
- Use cases in manufacturing to improve production performance, training for technicians, faster input on parts needed or other responsive needs

- Need to consider cognitive distraction
 - Sometimes it gets in the way of productivity, but can be good for quality control to be able to provide quick feedback. Understand task analysis of when they actually need to be connected.
- Wearables embedded in clothing for specific tasks