Unit 2: Introduction to Mobile Devices in Construction
Welcome to Introduction to Mobile Devices in Construction

• Your instructor
• Orientation
• Class guidelines
• Participant introductions
  • Your name, company and position
  • What is your level of Mobile Device experience? Never use them? Occasional user? Every day user? Use for business?
  • What you want to get out of this course?
• Closing forms and evaluations
BIM-MASONRY EDUCATION PROGRAM OVERVIEW

A series of courses that progressively cover a range of **Building Information Modeling** topics including:

1. Introductory Computer Course
2. Introduction to Mobile Devices in Construction
3. AGC BIM Unit 1: An Introduction to Building Information Modeling
4. Masonry BIM Applications
5. BIM for Masonry Software Training
BIM-MASONRY GUIDELINE ICONS

Definition

Group Discussion

Video

Activity

Review / Summary
COURSE LEARNING OBJECTIVES

• Recognize basic concepts of mobile devices and identify applications suited to construction activities
• Identify the advantages of mobile devices on a construction site
• Identify the types of mobile device apps used on a construction site
• Describe the concept of “cloud” computing
SESSION 2: APPLICATIONS
SESSION 2 LEARNING OBJECTIVES

• Define mobile applications

• Identify typical construction functions that can be supported by mobile apps

• Discuss the use of mobile apps in your daily activities
SESSION 2 AGENDA

• Overview of mobile applications

• Evolution of mobile applications

• Example applications for construction

• Future technology – expanding and going beyond mobile applications
APPLICATION DEFINED

• A mobile app is a computer program designed to run on smartphones, tablet computers and other mobile devices.

• The term "app" is a shortening of the term "application software".

* http://en.wikipedia.org/wiki/Mobile_app
CONCEPT OF APPLICATIONS

• Apps are usually available through application distribution platforms, which began appearing in 2008.
• Some apps are free, while others must be bought. Usually, they are downloaded from the store to a target device, such as:
  – iPhone, BlackBerry, Android, or Windows

* http://en.wikipedia.org/wiki/Mobile_app
E VOLU TION OF A PP LI C AT I ONS

Mobile apps were originally offered for general productivity and information retrieval;

- Email
- Calendar
- Contacts
- Stock market
- Weather information
EVERYDAY AND CONSTRUCTION APPS

Image source:
http://static.wixstatic.com/media/b66d43_e9018e755b8cca47705d6447aa82ea35.jpg_srz_230_1
47_75_22_0.50_1.20_0.00_jpg_srz
APPLICATIONS ACTIVITY

Examples:
What activities do you use your phone for on a daily basis?

• Email
• Calendar
• Contacts
• Weather information
• Mobile games

SESSION 2: APPLICATIONS
APPLICATONS ACTIVITY

Examples:
What activities do you use your phone for that are work related?

• GPS
• Location-based services
• Banking
• Order-tracking
APPLICATIONS RELATED TO CONSTRUCTION

• Planning

• Estimating

• Scheduling

• Project management

• Accounting
  – Project accounting
  – Travel

• Jobsite
  – Safety
  – Contractor meetings
  – Document control
    • Plans
    • Submittals/shop drawings
      – Laydown
      – Installation
      – Coordination
ESTIMATING

- Create project estimates while you’re on-site
- Email a PDF to your customer, or print a hardcopy to a printer
- Cost items at your fingertips
- Localized cost breakdowns for thousands of common construction items
- Save commonly-used costs to your own custom cost book

Image Source: http://www.constructioncostestimator.com/
ESTIMATING

- Send your client estimate before you leave jobsite
- Build estimates and invoices quicker by creating and selecting from your list of commonly used materials and labor rates
- Create, organize, and store valuable client info
- Complete work at the jobsite or in truck, rather than spending your evenings and weekends catching up on paperwork
- Customized, professional looking estimates and invoices

Image source: http://www.joistapp.com

SESSION 2: APPLICATIONS
SCHEDULING

- Cloud-based software for home builders and remodelers
- Integrated project management platform
- Customize schedule templates
- Automatic notifications keep all parties apprised of developments
- Customizable report formats
- Schedule automatically recalculates based on task/activity updates

Image source: http://www.buildertrend.com
SCHEDULING

- Connects to desktop office-based software
- Fully integrated with MS Project, Primavera, and other programs
- See up-to-the-minute project status
- Manage daily tasks at a glance
- Status of RFIs, change orders, construction project management tasks, and punch list items are reported using a red/yellow/green chart for ease of use
- Color-based visual cues reduce “data overload” onsite

Image source: http://www.procore.com

SESSION 2: APPLICATIONS
PROJECT MANAGEMENT

- Coordination across internal and external forces
- Workflows and deadlines can be created
- Manage RFIs and change orders
- Document review and approval
- Manage LEED compliance documentation
- Integrated BIM viewer with collaborative markup ability
- Compile handover documents and update as-builts

Image source: http://www.aconex.com
PROJECT MANAGEMENT

• Project “dashboard” provides immediate insight into:
  • Project portfolio management
  • Status of project communications
  • Status of open project issues
  • Daily scheduled tasks
• Contract and change order management
• Submittal and transmittal tracking
• Punch list status and completion
ACCOUNTING: PROJECT ACCOUNTING

• Integrated with office-based desktop software
• Works on iPad/iPhone and Android systems
• Create and send invoices
• Mark invoices as paid
• See and manage outstanding balances

Image source: http://quickbooks.intuit.com/mobile/
ACCOUNTING: TRAVEL

- Book airfare, hotels and more
- Manage flight, hotel and car itineraries
- Approve travel requests
- View credit card transactions and add them to expense reports
- Capture receipts with your camera phone
- Submit and approve expense reports and invoices

JOBSITE: SAFETY

- Create custom safety audit templates and forms
- Sync mobile devices with desktop software for real-time auditing and reporting
- Take photos with the phone’s camera and mark them up in real time

JOBSITE: SAFETY

- Real-time GPS location of workers with app installed on their mobile devices
- Customized SafetyGrid network of mobile device contacts
- Digital messaging among SafetyGrid network users
- Panic button feature for instant distress calls
- Visual confirmation that distress call has been received and acknowledged
- Real-time monitoring and medical evacuation services also available

Image source: http://www.safetygrid.net/
**JOBSITE: CONTRACTOR MEETINGS**

- Send and receive instant messages
- Face to face video and voice calls over a 3G or WiFi connection
- Low cost calls – domestic and international
- File sharing - photos, videos and documents
- Video messaging

Image source: http://www.skype.com
JOBSITE: CONTRACTOR MEETINGS

• Collaboration from anywhere with a cellular or wireless signal – works on iPhone/iPad, Android, and Blackberry
• Present dynamic webinars and sessions
• Deliver online training
• Record meetings
• Share computer’s desktop and files with other callers

Image source: http://www.webex.com/

Video source: http://www.webex.com/
JOBSITE: DOCUMENT CONTROL

• Central document storage – photos, CAD files, drawings, and documents
• Syncs to Enterprise version on office desktops
• Works on Apple and Android devices
• Integrated markup tools
• Access files from a single location – avoids version errors

Image source: http://www.e-builder.net/
JOBSITE: DOCUMENT CONTROL

- Allows mobile plan reading
- Compatible only on the iPad
- Scalable to project needs
- Training and project onboarding
- Plans can be seen by the whole team
- Plans for unlimited sheets available

Image source: http://www.plangrid.com

SESSION 2: APPLICATIONS
JOBSITE: LAYDOWN

- Radio Frequency Identification (RFID)
- Requires compliant RFID hardware – part of total asset tracking system
- Compatible only on iOS
- Track tagged materials during receiving, storage, and installation
- Assign tags to zones in the laydown area
- Track installation of tagged materials and generate reports

Image source: http://www.iautomate.com/categories/RFID/
JOBSITE: LAYDOWN

- GPS apps were first made for camping and outdoors enthusiasts.
- Many apps currently exist and are in wide use.
- Can set up waypoints around jobsite and designate specific areas.
- Waypoints can be shown on one screen or listed.
- Compass can be used to provide accurate bearings.
JOBSITE: INSTALLATION

• Many of the previous apps deal with checklists, daily logs, issues, RFIs, punch list items, and submittals

• A large group of general utility apps can be helpful during installation activities

• Note: Just like with traditional tools, use the right app for the right job
JOBSITE: INSTALLATION

Compass Level - Android

ConvertPad Unit Converter - Android

JOBSITE: COORDINATION

- Autodesk BIM 360 Field connects desktop software and in-field app
- Users can create and resolve issues
- Allows plan viewing by registered project users
- Safety and commissioning checklists can be created and run

Image source: http://www.autodesk.com/products/bim-360-field/overview
JOBSITE: TRANSLATION

Translation Apps
• Overcome language barriers across project teams

Google Translate
• Android and iOS
• Text or audio translation
• Works offline

Text Grabber + Translator
• Android and iOS
• Translates text in images
• Use the phone camera to take a photo, identify text, and translate to the desired language


Video source: http://www.abbyy.com/textgrabber/
APPS ARE CHANGING THE WAY WE DO BUSINESS

• Do you really need a fax machine?
• Are you carrying large sets of paper drawings? Maintaining separate job and office sets?
• Are you using scanners?
• Are you using paper field notes?
FAXING

• Several FAX apps: ex., iFAX, Breezy Print and FAX, JotNot FAX
• All allow incoming FAXes; some allow outgoing
• Send documents stored on phone or in a cloud-based application such as Google Drive or DropBox

Image source: http://www.ifaxapp.com
**FIELD NOTES**

- Available for iPhone/iPad, Android, computers, and web
- Create and share lists with selected contacts
- Users can add comments in a chat window format to shared lists
- Sync lists in real-time across users and across mobile and desktop devices

Images source: http://www.wunderlist.com
Remote Desktop Control

- Chrome Remote Desktop
- Compatible with Android and iOS
- Secure remote access to all computers through the app
- App is installed on each computer and the mobile device
- Only permits screen sharing – no file transfer or device to device chatting

MOBILE DEVICE BENEFITS TO CONTRACTORS

- Enhanced communication and collaboration
- Smart decision-making
- Increased productivity
- Better accuracy
- Preventing bottlenecks
- Better customer service
- Mobility
- Increased profitability
MOBILE DEVICES ON THE JOB

- Digital Communication: Emailing, Cloud Storage
- Utilities: calculators, memo notes, scanning, faxing, unit converter, translator, camera, remote PC control, GPS function, etc.
- Construction Utilities: leveler, measuring, plan reading
CHALLENGES WITHOUT MOBILE DEVICES

What are some ways that mobile devices have helped you?

Examples:

• Access to all drawings in field
• Keeping current set of drawings
• Communication: access to email
• Real time information to help crews in field
MOBILE DEVICES CHALLENGES!

What are some ways that mobile devices have hindered you on jobsites?

Examples:
• Some mobile devices are very fragile!
• Reliance on devices can lead to work stoppage due to device, software, or network errors
• Can be disruptive, too much information coming in all the time.
**Future Tech – Beyond Mobile Apps**

- Mozilla Seabird
  - Phone concept that will change mobile meetings
  - Mobile projector
  - 3D interactivity with device

Video source: https://www.youtube.com/watch?v=oG3tLxEQEdg
FUTURE TECH – BEYOND MOBILE APPS

• Mozilla Seabird
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  – Mobile projector
  – 3D capable

• Coin Card
  – One card to store all payment cards

Video source: https://www.youtube.com/watch?v=w9Sx34swEG0
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• Drone – GoPro Cameral - ReCap

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MOBILE DEVICE CASE STUDY

University of Michigan – South Quadrangle Renovation
$60 Million Renovation of one of the largest residence halls, is located in the heart of Central Campus, right across the street from the Union and a short walk to State Street shops and most University buildings.

Quick Facts:
- Houses approximately 1170 students, co-ed
- Newly renovated student bathrooms
- Integrated fire and smoke alarms, fire suppression system
- Wireless, high-speed internet throughout
- Air conditioning for dining and community spaces
- New Community Center with lounge and kitchen
- Group study rooms
- Music practice rooms
- New central campus dining center
MOBILE DEVICE CASE STUDY

University of Michigan – South Quadrangle Renovation

Project Beginning:
Field verification with large BIM laptop and large roll of drawings being carried around the jobsite.
• Challenge of finding power outlet for heavy laptop.
• Drawings constantly blowing in the wind.

2 Months later:
BIM360 Field app was implemented by the construction manager.
• Allowed me to carry all drawings on my IPad
• IPad could also be used to document field verification information.
• Battery life of IPad lasted 12+ hours (no need to plug in)

4 Months later:
Plumbing contractor uses IPad to communication construction issues;
• Take pictures of field conditions.
• Take screenshots of drawings and of 3D models.
• Communicate issues with detailers directly from the field via e-mail.
SESSION 2 SUMMARY

• Apps have rapidly developed to support a wide variety of user needs and functions

• Many construction-related apps are available

• Use the “right app for the job”

• Technological advancement is rapidly changing the way we think of mobile devices and apps