Mobile Applications

Make an informed decision
% of U.S. adults who own the following devices

Source: Surveys conducted 2002-2018.

http://www.pewinternet.org/fact-sheet/mobile/
<table>
<thead>
<tr>
<th></th>
<th>Any cellphone</th>
<th>Smartphone</th>
<th>Cellphone, but not smartphone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>95%</td>
<td>77%</td>
<td>17%</td>
</tr>
<tr>
<td>White</td>
<td>94%</td>
<td>77%</td>
<td>17%</td>
</tr>
<tr>
<td>Black</td>
<td>98%</td>
<td>75%</td>
<td>23%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>97%</td>
<td>77%</td>
<td>20%</td>
</tr>
<tr>
<td>Urban</td>
<td>96%</td>
<td>83%</td>
<td>13%</td>
</tr>
<tr>
<td>Suburban</td>
<td>94%</td>
<td>78%</td>
<td>16%</td>
</tr>
<tr>
<td>Rural</td>
<td>91%</td>
<td>65%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Source: Survey conducted Jan. 3-10, 2018.

http://www.pewinternet.org/fact-sheet/mobile/
https://android.jlelse.eu/apple-vs-android-a-comparative-study-2017-c5799a0a1683
### Smartphone Subscribers Age 13+

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Feb-2018</th>
<th>Apr-2018</th>
<th>Point Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Android</td>
<td>53.4%</td>
<td>54.3%</td>
<td>0.9</td>
</tr>
<tr>
<td>2</td>
<td>Apple</td>
<td>45.4%</td>
<td>44.6%</td>
<td>-0.8</td>
</tr>
<tr>
<td>3</td>
<td>Microsoft</td>
<td>0.8%</td>
<td>0.8%</td>
<td>0.0</td>
</tr>
<tr>
<td>4</td>
<td>BlackBerry</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.0</td>
</tr>
</tbody>
</table>

https://www.huffingtonpost.com/2011/08/05/iphone-android-state_n_919488.html
Breakdown of App Stores

Apple/iOS App Store

- Costs ~$110/yr ($99 + fluctuating surcharges)
- Roughly 2.25 million apps in the store

Google Play/Android Store

- Costs $25 one time fee
- Roughly 3 million apps in the store

## Developing a Native App

<table>
<thead>
<tr>
<th>iOS app</th>
<th>Android app</th>
</tr>
</thead>
<tbody>
<tr>
<td>Must be built on macOS</td>
<td>Build on any operating system</td>
</tr>
<tr>
<td>Develop in XCode</td>
<td>Develop in Android Studio or use plugins</td>
</tr>
<tr>
<td>Uses Swift or Objective-C</td>
<td>Uses XML and Java</td>
</tr>
<tr>
<td>Longer store pre-review</td>
<td>Harder to provide support for all users</td>
</tr>
<tr>
<td>process</td>
<td></td>
</tr>
</tbody>
</table>
## Developing a Cross-platform App

<table>
<thead>
<tr>
<th>Unity app</th>
<th>Web wrapper app</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unity is free, but you must pay to remove watermark</td>
<td>Phonegap, Reactive Native, and similar frameworks are free</td>
</tr>
<tr>
<td>Knowledge of C# programming language</td>
<td>Knowledge of JavaScript, CSS, and HTML</td>
</tr>
<tr>
<td>Same code can be used for kiosk or website version</td>
<td>Some code can be reused for a website version</td>
</tr>
</tbody>
</table>

Both require macOS to export for iOS.
Mobile OS Fragmentation
Adoption of the latest iOS and Android versions in June 2016

iOS
- iOS 9: 89.6%
- iOS 8: 6.1%
- Older: 4.2%

Android
- Marshmallow 6.X.X: 24.7%
- Lollipop 5.X.X: 37.5%
- Jelly Bean 4.1.X-4.3.X: 8.8%
- Kit Kat 4.4.X: 27.9%
- Older: 1.1%

Source: Mixpanel, Statista
comScore 2017 Mobile App Report presentation
Top 10 Mobile Apps by Penetration of App Audience

Source: comScore Mobile Metrix, U.S., Age 18+, June 2017

- Facebook: 81%
- YouTube: 71%
- FB Messenger: 68%
- Google Search: 61%
- Google Maps: 57%
- Instagram: 50%
- Snapchat: 50%
- Google Play: 47%
- Gmail: 44%
- Pandora: 41%

comScore 2017 Mobile App Report presentation
Most Essential Apps 18-34 Year-Olds Said They ‘Can’t Go Without’

Source: comScore Custom Survey, U.S., Age 18+, 2017 Wave

- Amazon: 35%
- Gmail: 30%
- Facebook: 29%
- FB Messenger: 18%
- YouTube: 16%
- Google Maps: 14%
- Google Search: 11%
- Apple App Store: 11%
- WhatsApp: 11%
- Instagram: 11%

* Survey respondents were asked to select their top 3 ‘most essential’ apps (i.e. the apps they couldn’t go without) of the apps they own.
Native App Pros and Cons

- Pro: Native apps are faster and use less battery
- Pro: Native app interfaces directly with the phone’s OS
- Pro: You do not have to host anything unless you want to

- Con: Slow update cycle or users may never update your app
- Con: Vying for attention on the device
- Con: Older devices may never see your app
Cross-Platform and Wrapped App Pros and Cons

- Pro: You do not have to host anything unless you want to
- Pro: Write app once and ship to multiple platforms with few changes

- Con: Must interface with phone’s OS through secondary system
- Con: Some advanced features may use more battery power than a native app
- Con: Slow update cycle or users may never update your app
- Con: Vying for attention on the device
- Con: Older devices may never see your app
Mobile Apps on the Web

Web technologies now allow you to create mobile experiences in the browser.

- Responsive Web Sites
- Progressive Web Apps
Responsive Web Sites

- Use HTML, CSS, and Javascript on your existing Website
- Code can detect user’s device specs and resize itself accordingly
- Visible to search engines
Responsive Web Sites

http://thinkapps.com/blog/development/responsive-web-vs-native-apps/
Web Apps and Progressive Web Apps

- Can be saved to the home screen of the device to look and feel like an app
- Limited access to hardware features to feel more like an app
- Use HTML, CSS, and Javascript on your existing Website
- Code can detect user’s device specs and resize itself accordingly
- Your page can respond to touches and gestures as if it were an app
- Visible to search engines
Google’s definition of Progressive Web Apps

- Must be hosted on an https server
- Must provide app-like interface and be responsive
- Must work offline and load quickly
- Must have add to home functionality
- May store data to user’s device
- Must work cross browser

https://developers.google.com/web/progressive-web-apps/checklist
https://sii.im/playground/notes/
Progressive Web Pros and Cons

- **Pro:** Full control over update cycle
- **Pro:** Write app once and ship to multiple platforms with few changes
- **Pro:** Access to more device hardware features than traditional web site

- **Con:** Must interface with phone’s OS through secondary system (browser)
- **Con:** Older devices/browsers may not load your app properly
- **Con:** Some hardware features not available (yet)
https://whatwebcando.today/

Native Behaviors

- LOCAL NOTIFICATIONS ✓
- PUSH MESSAGES ✓
- HOME SCREEN INSTALLATION ✓
- FOREGROUND DETECTION ✓
- PERMISSIONS ✓
Adobe stopped supporting mobile Flash in 2011

Android Flash install was disabled in 2012

http://hightea.wellcomeapps.com/
Responsive Web App from Peabody Essex Museum

Mood-O-Meter

- Developed in 2014
- Inspired by BuzzFeed quizzes

http://connected.pem.org/dissecting-our-mood/
Responsive Web App from Peabody Essex Museum

- Series of questions results in a unique painting from the exhibition
- Uses Shake gesture on devices

http://turner.pem.org/
Responsive Web App from Culture24

VanGo Yourself
- Developed in 2015
- Mobile first design
- Accesses Camera

Responsive Web App from Victoria and Albert Museum

Design a Wig
- Developed in 2016
- Designed around touch interface

https://www.vam.ac.uk/designawig/
#EMPTYMET

- Started in 2014
- Capitalizes on Instagram celebrities spreading content

http://stories.davekrugman.com/emptymet
Text Messaging Interface from SFMOMA

SendMe
- Developed in 2017
- Uses phone’s text app to interface to database

https://techcrunch.com/2017/07/10/you-can-text-sfmoma-and-it-will-respond-with-art-on-demand/
Virtual Reality Tour

- Developed in 2017
- Found via Facebook

Native app from LACMA

- Developed in 2010
- Updated every year
- Nothing that could not be done in PWA

itunes.apple.com/us/app/lacma/id409488167
Native app from Rijksmuseum

- Developed in 2013
- Updated every year
- Nothing that could not be done in PWA

itunes.apple.com/gb/app/rijksmuseum/id621307961
Progressive Web App from London’s Natural History Museum

- Developed in 2018
- Mascots speak to kids in fake texts
- Heavily uses camera

https://www.nhm.ac.uk/naturenauts
Native App from Google Arts & Culture

- Released in 2018
- Matches your face to art
- PWA version eliminates camera features

http://money.cnn.com/2018/01/15/technology/google-art-selfie-app-how-to/index.html
Native App from Google Arts & Culture

- Blocked in Texas and Illinois because of their privacy laws

http://time.com/5106798/google-selfie-app-not-work-states/
Native App for NMHU Practicum Project

● Developed in 2018
● Chose native app because of text recognition framework
Native App for Coronado Historic Site

- Developed in 2015
- Could be PWA now
Practicum class cost and schedule

- $1500-$3000 depending on size of the project.
- Employs multiple students and an academic advisor
- Fall and Spring semester timelines (3-4 mo. timeframe)
- Send proposal as soon as you have an idea