GCS 3205 – Mobile Web Application

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Lecture-1 Introduction

Outline

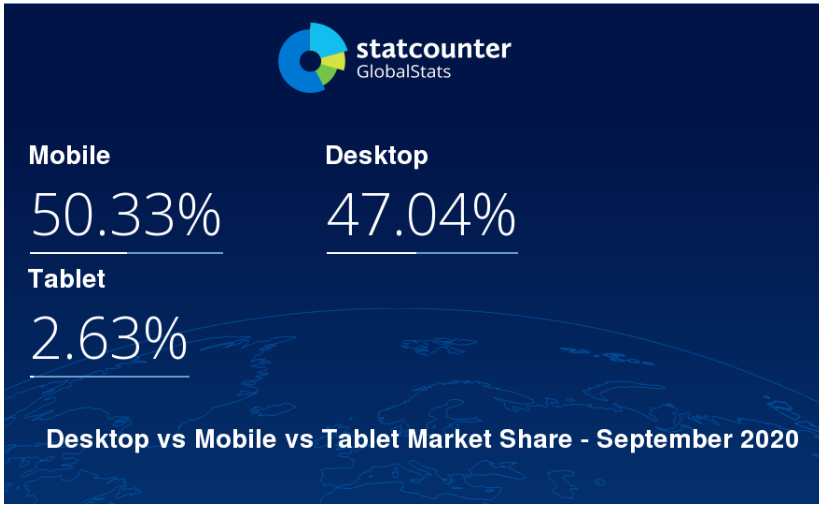
- Introduction – Why Mobile Web
- Mobile Web vs Native vs Hybrid
- Building Cross-Plaform Native Apps
- Design Strategies
  - Graceful Degradation vs Progressive Enhancement
  - Mobile First vs Responsive Design
- User-centered Design
- Mobile Web Development Tools & Framework
- Performance Issues and Optimization Techniques

The Web

Internet of Things

Why Mobile Web?

- There are 3.5 billion smartphone users worldwide.
- Mobile web traffic accounts for 52.6 percent of global web traffic.
- 69 percent of internet users prefer to look for reviews on their phones than approach an in-store employee.
- More than two-thirds of the total digital ad spend in 2019 was on mobile ads.



Mobile Web App vs Native App vs Hybrid App

- Mobile Web App
  - They are built using web technologies i.e. HTML5, CSS3 and JavaScript.
  - Users do not have to install the app but they are able to interact with it via a web browser .
  - The App is not OS-specific. It can work on multiple mobile OS such as iOs, Android, Microsoft, RIM, etc.
  - Easy to build and maintain – allows for rapid prototyping

Examples ??

Mobile Web App vs Native App vs Hybrid App

- Native App
  - A native app is a software application built in a specific programming language, for the specific device platform e.g. iOS or Android
  - Native iOS apps are written in Swift or Objective-C and native Android apps are written in Java/Kotlin/C++.
  - Fast and Responsive
  - Leverage wider device functionality i.e. camera, microphone, compass, accelerometer and swipe gestures.
  - Safe and secure — native apps must first be approved by the app store

Mobile Web App vs Native App vs Hybrid App

- Native App – Downside
  - More expensive to build than web apps
  - Compatibility with different platforms (i.e. iOS and Android) usually means designing and building the app from scratch
  - Expensive to maintain and update
  - It may prove difficult to get a native app approved by the app store
  - Maintain multiple codebases and development team

Examples ??

Mobile Web App vs Native App vs Hybrid App

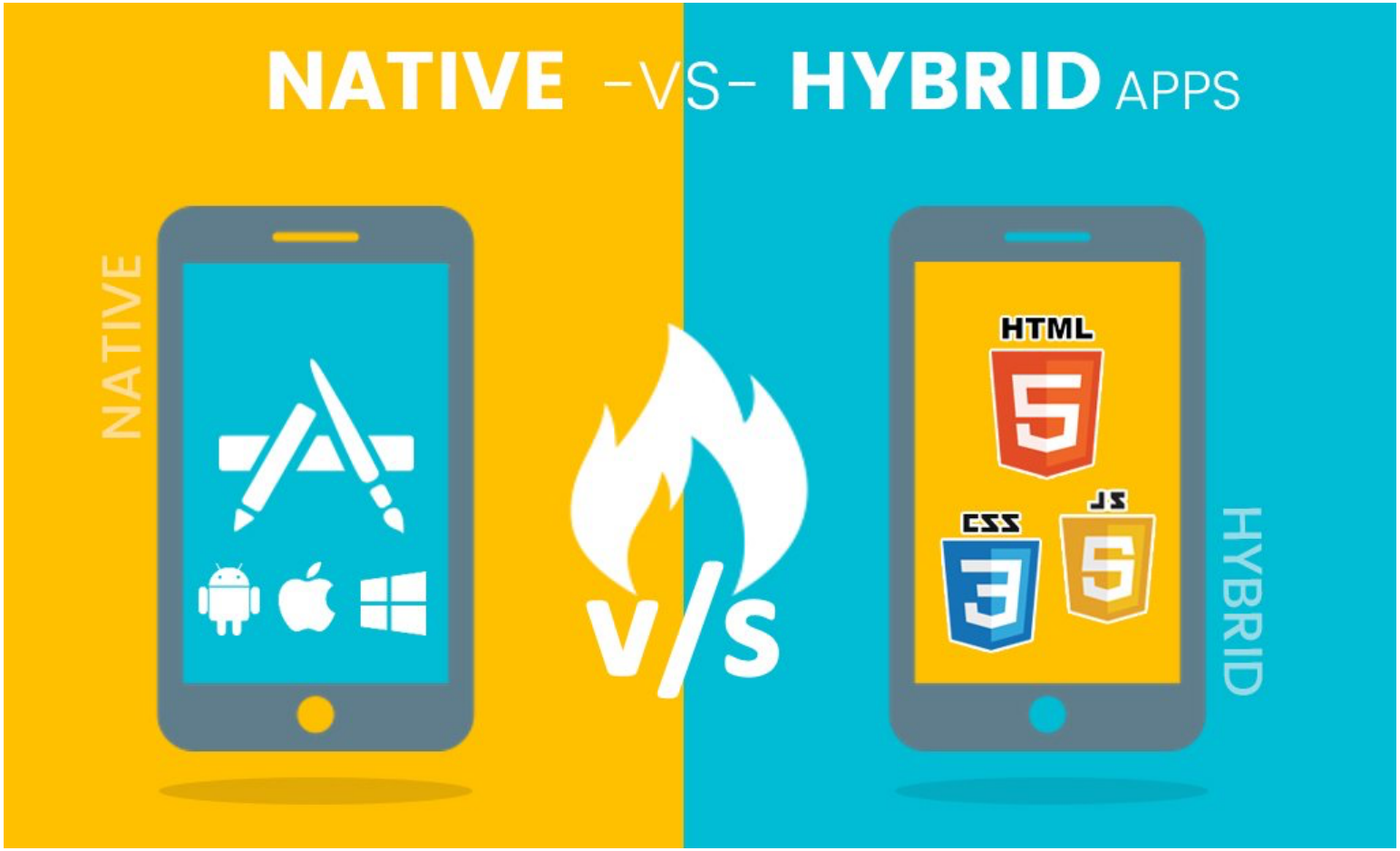
- Hybrid App
  - They are built using web technologies i.e. HTML5, CSS3 and JavaScript.
  - Bundled using tools like Apache Cordova (PhoneGap), Ionic, etc – making it installable just like a native app.
  - Deployed in a native container that uses a mobile **WebView** object

Mobile Web App vs Native App vs Hybrid App

- Hybrid App - Advantages
  - Cross-platform capability.
  - One codebase to maintain – easy and less expensive.
  - Scalability

- Hybrid App - Disadvantages
  - Performance issues – poor user experience.
  - Optimization for cross-platform compatibility is challenging

Mobile Web App vs Native App vs Hybrid App



Building Cross-platform Apps

- Frameworks
  - React Native – Facebook
  - Xamarin - Microsoft
  - Flutter – Google
  - Ionic – Open-source MIT License
  - etc

100% cross-plaform native Apps

Design Strategies

- **Graceful Degradation** -
  - is the practice of building your web functionality so that it provides a certain level of user experience in more modern browsers, but it will also *degrade gracefully* to a lower level of user in experience in older browsers.
  - This lower level is not as nice to use for your site visitors, but it does still provide them with the basic functionality that they came to your site to use; things do not break for them.

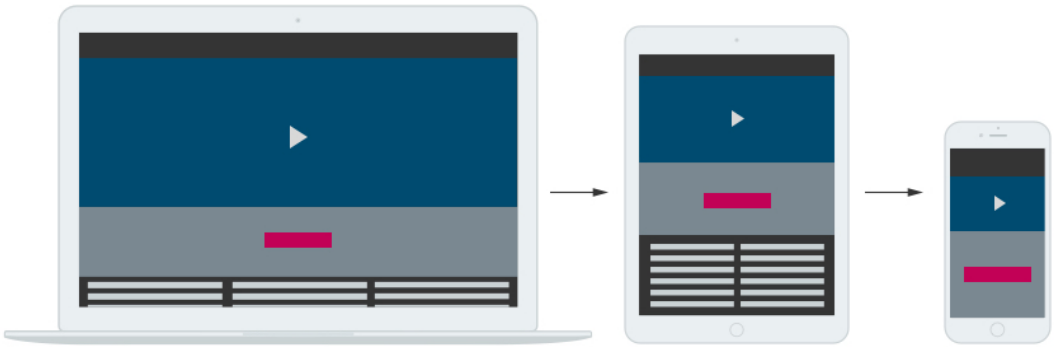
Design Strategies

- **Progressive Enhancement**
  - is similar, but it does things the other way round. You start by establishing a basic level of user experience that all browsers will be able to provide when rendering your web site, but you also build in more advanced functionality that will automatically be available to browsers that can use it.

Mobile First vs Responsive Web Design

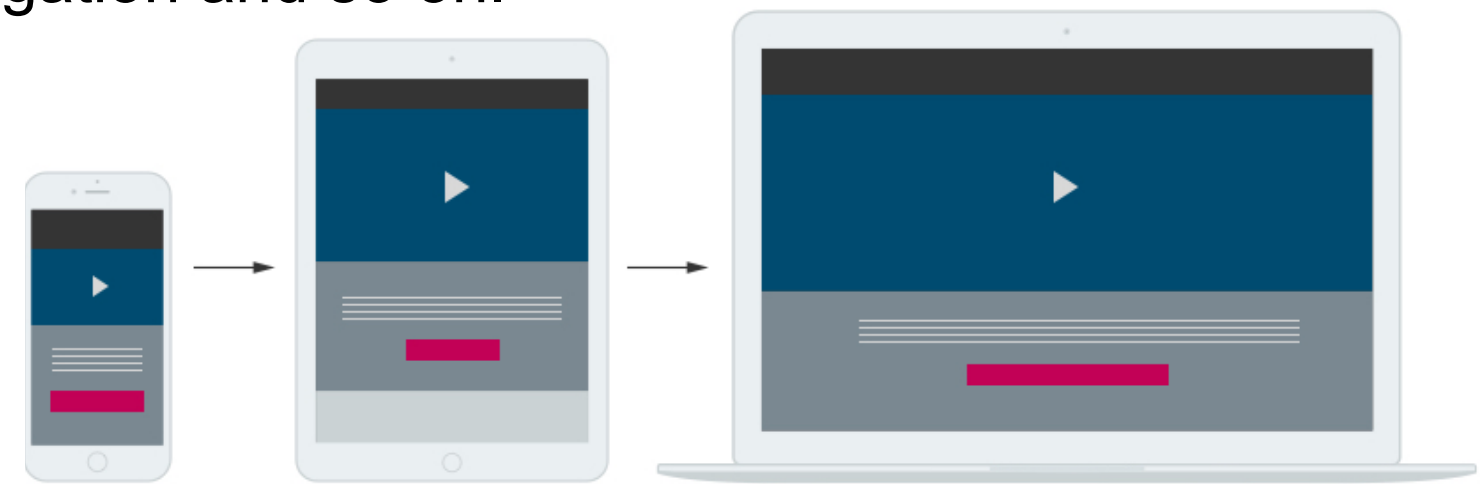
❑ **Responsive Web Design**

Responsive design starts on the desktop; that is, at the maximum required resolution, and then scales down to the smallest screen. Even though the content and layout contract to fit smartphones, the navigation, content and download speeds are geared more for your traditional website.



Mobile First vs Responsive Web Design

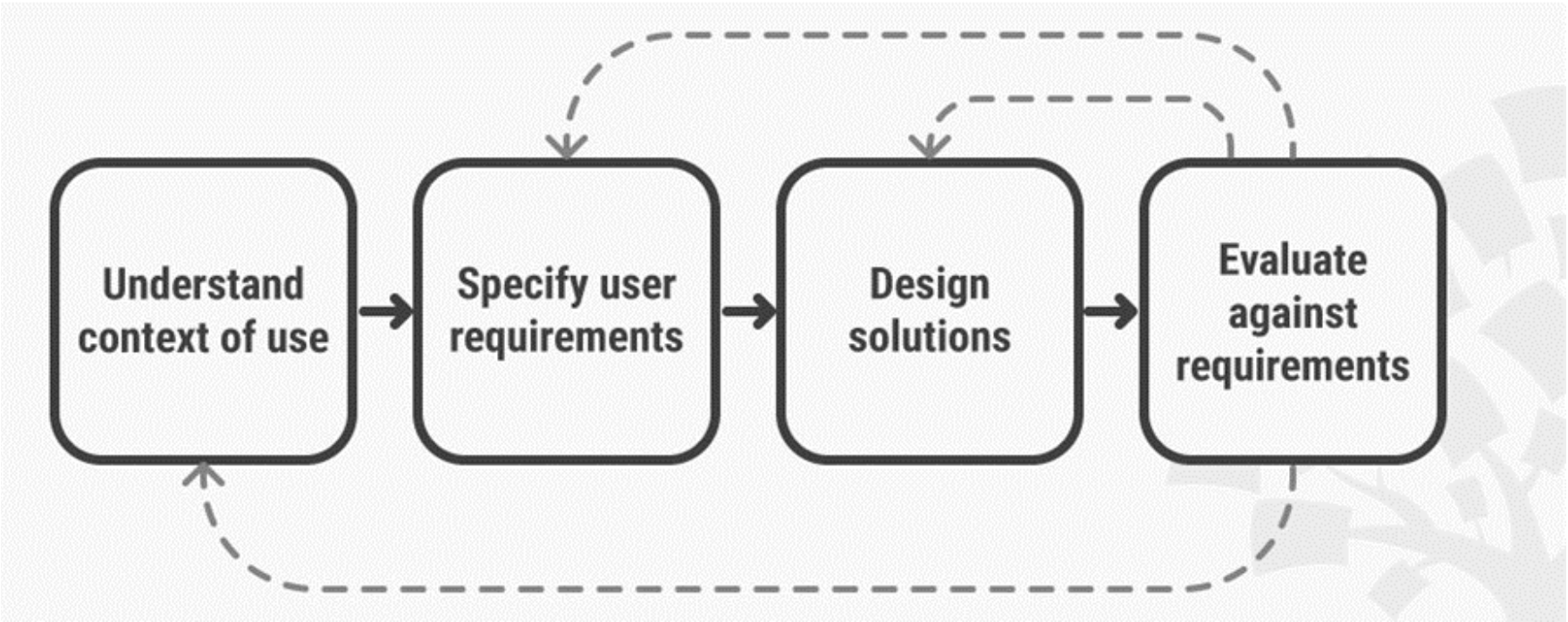
❑ **Mobile First Web Design**
is similar to designing a mobile app and then adapting the layout that it can be viewed neatly on tablet and desktop devices without too many modifications. Your whole design and layout are based on providing excellent mobile user-experience: fast download speeds, rich media content to keep your target audience interested, easy touchscreen navigation and so on.



User-centered Design

- User-centered design (UCD) is an iterative design process in which designers focus on the users and their needs in each phase of the design process.
- Design teams involve users throughout the design process via a variety of research and design techniques, to create highly usable and accessible products for them.
- Use a mixture of *investigative* methods and tools (e.g., surveys and interviews) and *generative* ones (e.g., brainstorming) to develop an understanding of user needs.

User-centered Design



User-centered design is an iterative process that focuses on an understanding of the users and their context in all stages of design and development

User-centered Design - Advantages

- With close user involvement, products are more likely to meet users' expectations and requirements.
- Systems designers tailor products for people in specific contexts and with specific tasks.
- Putting designers in close contact with users means a deeper sense of empathy emerges. This is essential in creating ethical designs that respect privacy and the quality of life.
- By focusing on all users of a product, designers can recognize the diversity of cultures and human values through UCD – a step in the right direction towards creating sustainable businesses.

Mobile Web Development – Technologies, Tools and Frameworks

iOS: iPhone, iPad, ...

jQuery mobile

Sencha

Visual Studio Code

PhoneGap

Performance Optimization

- Image Optimization
  - Image load time is well-known to be one of the biggest performance issues affecting page load on mobile devices.
  - Use online image optimizers
- Code Compression
  - Compress your JavaScript and CSS files – minified
- Database queries optimization
- Content delivery networks (CDN)
  - If you are planning to provide lots of videos, images, audio files, or other types of media, use of a CDN is highly recommended.

Reading Assignment

- Adaptive Web Design [PDF Provided]

Review Questions

- Explain the following concepts, clearly outline their differences and similarities.
    - Mobile Web, Native App, Hybrid App
- What is the technical difference between Native and Hybrid App
- Why do native apps typically deliver superior performance
- Outline some of the drawbacks of user-centerd design
- Explain the concept of Progressive Enchancement and Graceful Degradation

THANK YOU