Instructor’s Manual: Chapter 4

Building an E-commerce Presence: Websites, Mobile Sites, and Apps

# Learning Objectives

After reading this chapter, your students should be able to:

* Understand the questions you must ask and answer, and the steps you should take, in developing an e-commerce presence.
* Explain the process that should be followed in building an e-commerce presence.
* Identify and understand the major considerations involved in choosing web server and e-commerce merchant server software.
* Understand the issues involved in choosing the most appropriate hardware for an e-commerce site.
* Identify additional tools that can improve website performance.
* Understand the important considerations involved in developing a mobile website and building mobile applications.

# Key Terms

A/B testing (split testing), p. 211

acceptance testing, p. 211

accessibility rules, p. 234

Active Server Pages (ASP), p. 230

ActiveX, p. 231

adaptive web design (AWD), p. 239

ASP.NET, p. 230

benchmarking, p. 212

business objectives, p. 203

ColdFusion, p. 232

co-location, p. 208

Common Gateway Interface (CGI), p. 229

content management system (CMS), p. 206

Django, p. 232

dynamic page generation, p. 217

e-commerce merchant server software, p. 219

hardware platform, p. 222

horizontal scaling, p. 226

hybrid app, p. 237

I/O intensive, p. 224

information requirements, p. 203

Java Server Pages (JSP), p. 231

Java, p. 230

JavaScript, p. 231

logical design, p. 204

merchant server software package (e-commerce software platform), p. 220

mobile first design, p. 239

mobile web app, p. 234

mobile website, p. 234

multi-tier architecture, p. 214

multivariate testing, p. 212

native app, p. 234

online catalog, p. 219

open source software, p. 220

outsourcing, p. 204

PHP, p. 232

physical design, p. 204

privacy policy, p. 234

responsive web design (RWD), p. 239

Ruby on Rails (Ruby, RoR/Rails), p. 232

scalability, p. 224

shopping cart, p. 220

site management tools, p. 216

stateless, p. 224

SWOT analysis, p. 197

system architecture, p. 214

system design specification, p. 204

system functionalities, p. 203

system testing, p. 211

systems development life cycle (SDLC), p. 202

two-tier architecture, p. 214

unit testing, p. 211

VBScript, p. 231

vertical scaling, p. 224

web application server, p. 218

widget, p. 232

WordPress, p. 206

# Brief Chapter Outline

*The Wall Street Journal: Redesigning for Today’s Platforms*

4.1 Imagine Your E-commerce Presence

What’s the Idea (The Visioning Process)

Where’s the Money: Business and Revenue Model

Who and Where Is the Target Audience?

What Is the Ballpark? Characterize the Marketplace

Where’s the Content Coming From?

Know Yourself: Conduct a SWOT Analysis

Develop an E-commerce Presence Map

Develop a Timeline: Milestones

How Much Will This Cost?

4.2 Building an E-commerce Presence: A Systematic Approach

Planning: The Systems Development Life Cycle

Systems Analysis/Planning: Identify Business Objectives, System Functionality, and Information Requirements

System Design: Hardware and Software Platforms

Building the System: In-House versus Outsourcing

*Insight on Business: Weebly Makes Creating Websites Easy*

Testing the System

Implementation and Maintenance

Factors in Optimizing Website Performance

4.3 Choosing Software

Simple versus Multi-tiered Website Architecture

Web Server Software

Application Servers

E-commerce Merchant Server Software Functionality

Merchant Server Software Packages (E-commerce Software Platforms)

4.4 Choosing Hardware

Right-Sizing Your Hardware Platform: The Demand Side

Right-Sizing Your Hardware Platform: The Supply Side

4.5 Other E-commerce Site Tools

Website Design: Basic Business Considerations

Tools for Search Engine Optimization

Tools for Interactivity and Active Content

Personalization Tools

The Information Policy Set

*Insight on Society: Designing for Accessibility*

4.6 Developing a Mobile Website and Building Mobile Applications

Planning and Building a Mobile Presence

Mobile Presence: Design Considerations

Cross-Platform Mobile App Development Tools

Mobile Presence: Performance and Cost Considerations

*Insight on Technology: Carnival Cruise Ships Go Mobile*

4.7 Careers in E-commerce

4.8 Case Study: *Dick’s Sporting Goods: Taking Control of its E-commerce Operations*

4.9 Review

Key Concepts

Questions

Projects

References

# Figures

Figure 4.1 SWOT Analysis, p. 197

Figure 4.2 E-commerce Presence Map, p. 198

Figure 4.3 Components of a Website Budget, p. 200

Figure 4.4 Factors to Consider in Developing an E-commerce Presence, p. 201

Figure 4.5 Website Systems Development Life Cycle, p. 202

Figure 4.6 A Logical and Physical Design for a Simple Website, p. 205

Figure 4.7 Choices in Building and Hosting, p. 206

Figure 4.8 The Spectrum of Tools for Building Your Own E-commerce Site, p. 207

Figure 4.9 Costs of Customizing E-commerce Software Packages, p. 207

Figure 4.10 Factors in Website Optimization, p. 213

Figure 4.11 Two-tier and Multi-tier E-commerce Architectures, p. 215

Figure 4.12 Degradation in Performance as Number of Users Increases, p. 225

# Tables

Table 4.1 E-commerce Presence Timeline, p. 199

Table 4.2 System Analysis: Business Objectives, System Functionalities, and Information Requirements for a Typical E-commerce Site, p. 203

Table 4.3 Key Players: Hosting/Co-Location/Cloud Services, p. 208

Table 4.4 Basic Functionality Provided by Web Servers, p. 216

Table 4.5 Application Servers and Their Function, p. 219

Table 4.6 Open Source Software Options, p. 221

Table 4.7 Factors in Right-Sizing an E-commerce Platform, p. 223

Table 4.8 Vertical and Horizontal Scaling Techniques, p. 224

Table 4.9 Improving the Processing Architecture of Your Site, p. 226

Table 4.10 E-commerce Website Features That Annoy Customers, p. 227

Table 4.11 The Eight Most Important Factors in Successful E-commerce Site Design, p. 228

Table 4.12 Systems Analysis for Building a Mobile Presence, p. 237

Table 4.13 Unique Features That Must Be Taken into Account When Designing a Mobile Presence, p. 238

# Teaching Suggestions

This chapter walks students through the general process of building an e-commerce presence. It lays out a methodology for approaching the problem. It also considers the key issues in building an e-commerce presence and identifies some of the tools available that can help entrepreneurs and business managers. The chapter is based on the real-world experiences of the authors.

The key point for students to take away from this chapter is that building an e-commerce presence is a complex undertaking akin to building an entirely new information system. Major physical and human resources are required, and many firms find it cost-effective to outsource a part or all the effort to specialized firms. On the other hand, building an e-commerce presence has never been easier or cheaper. In general, the cost of building an e-commerce presence in 2017 is one-tenth the cost in the year 2000. This should be encouraging to any budding entrepreneurs in your class.

The opening case, *The Wall Street Journal: Redesigning for Today’s Platforms*, examines some of the factors involved in the redesign of the Wall Street Journal’s website and mobile apps. Here are some questions you can pose to the class to spark discussion about the case:

* What were WSJ’s objectives in redesigning its e-commerce presence?
* What considerations, if any, unique to the newspaper business were involved?
* What did WSJ do to meet the needs of mobile device users?

## Key Points

*Imagining Your E-commerce Presence.* Section 4.1 of the chapter (pages 194 to 200) walks the student through the process of creating an e-commerce presence, by developing an idea, understanding how the idea can potentially make money, defining the target audience and the marketplace, and determining what the content looks like. An important part of this effort involves performing a SWOT analysis, developing a presence map, and creating a timeline.

*A Method for Building E-commerce Sites.*In the early years of e-commerce, websites were often built one page at a time, with little advance planning. Many disasters resulted. Section 4.2 of the text borrows the systems analysis and design framework from large-scale systems and applies it to building an e-commerce website (which in reality is a large-scale system). Table 4.2 helps you walk students through business objectives, the level of system functionality needed, and information requirements. This plants the idea that systems, information, and business objectives are intimately connected.

This is also a good time to introduce the issue of outsourcing options and tool options. Figure 4.4 covers most of the outsourcing options, and Figure 4.5 illustrates the range of tool options. The *Insight* *on Business* case, *Weebly Makes Creating Websites Easy,* highlights Weebly, a company that was itself once a small start-up, and whose business model focuses on enabling small businesses to create websites easily and inexpensively. Some discussion questions for this case might include the following:

* What value does Weebly offer to small businesses?
* Are there any drawbacks to using Weebly to create an e-commerce presence?
* How are service providers like Weebly changing the nature of e-commerce?

Figure 4.10 provides a summary of factors to consider when optimizing the performance of a website. This can be useful in wrapping up the discussion on building a website.

*Choosing the Right Software.*Students are curious about where all the software needed to operate a website will come from. They often confuse web server hardware with web server software, confusion made possible by the widespread use of the generic “web server” phrase. Section 4.3 addresses these concepts. Three figures and tables capture the essence of the section. Figure 4.11 is a good place to start with a description of both a simple and a complex architecture for a website. Table 4.4 then provides a list of basic functionalities provided by web server software, whereas Table 4.5 provides a list of the many different types of application servers. Table 4.6 lists some open source software options for students who are interested in “doing it themselves” and “building their own.” You may want to walk students through each of these figures and tables.

*Choosing the Right Hardware.*We cover the hardware aspects of developing a website in Section 4.4. Students often want to know what hardware is required to run a website and how much is needed. Websites can be very simple. You can run a website in your basement with a single server connected to residential Internet access service, but it would not be able to serve many users very effectively. You may wish to start students with Figure 4.13, which shows what happens to processors as load increases. You will want to emphasize the impact of user profile and web page content on performance—the more interactive the content the more processor power is needed.

*The Variety of Site Development Tools.* In addition to server software and hardware, site developers use a wide variety of tools to build and manage an e-commerce site, which we review in Section 4.5. Design elements such as widgets and mashups enhance user interest and involvement. CGI, ASP/ASP.NET, Java, JSP, JavaScript, ActiveX, VBScript, ColdFusion, PHP, Ruby on Rails, and Django are all tools used to handle interactive elements on web pages. You may want to construct a table or PowerPoint slide that lists each of the tools and their respective functions.

*Information Policy Set.*Many site developers do not understand that a commercial website needs to have a set of information policies established by management that govern how information gathered at the site will be used. The *Insight on Society* case, *Designing for Accessibility,* asks students to think about how a site can be designed to serve the needs of disabled users, including the visually challenged and hearing impaired.

Questions for class discussion might include the following:

* Why might some merchants be reluctant to make their websites accessible to disabled users?
* How can websites be made more accessible?
* Should all websites be required by law to provide “equivalent alternatives” for visual and sound content?
* What additional accessibility problems do mobile devices pose?

*Developing a Mobile Website and Building Mobile Applications.* Section 4.6 introduces students to some issues surrounding developing a mobile website and building mobile applications. If possible, spend some time talking about the differences between mobile websites that are optimized for the mobile platform versus regular websites that are not, and what impact that might have on the m-commerce opportunities for the site. Although students are undoubtedly very familiar with different apps, they may not understand the distinction between a mobile web app, a native app, and a hybrid app. Table 4.12 applies the systems analysis and design framework first introduced in Section 4.1 and Table 4.1 to developing a mobile presence, and Table 4.13 highlights some unique features that students should be aware of that need to be taken into consideration when designing for the mobile platform. The section on mobile presence design considerations also covers several important trends in this area, including mobile first design philosophy, responsive Web design (RWD) and adaptive Web design (AWD). A section on cross-platform mobile app development tools highlights some of the various tools now available that make creating cross-platform mobile apps relatively easy and inexpensive. The *Insight on Technology* case, *Carnival Cruise Ships Go Mobile*, discusses the development of the Carnival Hub App, a mobile app now in use on a variety of Carnival cruise ships, as well as its new Ocean Medallion system.

Questions for class discussion might include the following:

* What influenced Carnival in deciding to create a mobile app?
* Are there any disadvantages in making a mobile app such a central part of the Carnival Cruise experience?
* How will the Ocean Medallion system add value to the cruising experience?

Section 4.7 offers students information and tips about how the concepts they’ve learned in this chapter can help them prepare for an interview for an entry-level position as a UX (user interface) designer.

The chapter-ending case study in Section 4.8 provides a rich discussion of both the business and technology considerations that shaped the decisions by Dick’s Sporting Goods to take over its own e-commerce operations after having outsourced them to eBay for a number of years.

# Case Study Questions

*1.**Why did Dick’s decide to leave eBay and take over its own e-commerce operations*?

The cost of working with eBay was growing rapidly as Dick’s became more successful in online sales. The fees eBay charged rose a percentage of sales even though it cost eBay no more to fulfill an expensive order than an inexpensive order. Dick’s also wanted to customize its web operations to the needs of its customers, in particular to develop an omnichannel business.

*2. What is Dick’s omnichannel strategy?*

Dick’s plans to use its physical stores as mini-distribution centers, fulfilling online orders from local and regional customers from physical stores located nearby. The stores can also act as showrooms for its goods, and customers could pick up online orders in nearby stores the same day.

*3.**What are the three steps in Dick’s migration to its new website?*

Step 1 involves developing the new site and integrating it with their existing systems. Step 2 involves moving its lesser brands to the new platform and continuing to develop the platform. Step 3 involves moving its primary website, Dick’s Sporting Goods, onto the new platform.

*4. What are the primary benefits of Dick’s new system?*

Among the primary benefits are the ability to buy online and pick up in store and the ability to test different pricing and marketing approaches by region. Other benefits include an improved search engine and better analytics capabilities. Dick’s also hopes to achieve higher sales because multi-channel customers spend three times as much as single-channel customers. Finally, the new system allows Dick’s to speed up the innovation and development cycles of its online and physical store operations.

# End-of-Chapter Questions

*1.**What are the main factors to consider when developing an e-commerce presence?*

The main factors to consider when developing an e-commerce presence are the organizational capabilities and human resources l needed to build and manage the site, the hardware, the software, the telecommunications infrastructure to meet the demands of your customers, and the site design to implement your business objectives.

*2.**Define the systems development life cycle and discuss the various steps involved in creating an e-commerce site.*

The systems development life cycle is a methodology for understanding the business objectives of any system so that an appropriate solution can be designed. The five major steps in the SDLC for an e-commerce site are: systems analysis, systems design, building the system, testing the system, and implementation. In the systems analysis step, the business objectives for the site are identified. The list of the necessary capabilities for the site is translated into lists of the types of information systems and the elements of information that will be needed to achieve them. Next, the main components in the system and their relationships to one another must be identified. The system design includes a data flow diagram and the physical components that will need to be purchased. After the system has been built and programmed, the program modules must be tested one at a time and then the site must be tested as a whole, examining every conceivable path a user might try to utilize while on the site. Implementation of an e-commerce site includes the continuing maintenance that will be needed over the life of the site to keep it functional, including correcting mistakes and continuing to improve, update, and modify links and other site features.

*3.**Discuss the differences between a simple logical and a simple physical website design.*

A simple, logical design for a website describes the flow of information at the site including the processing functions that must be performed and the databases that will provide information. It also includes a description of the security and emergency backup procedures and the controls that will be used in the system. A simple physical design, on the other hand, translates the logical design into the physical components that will be needed such as the servers, software, and size of the telecommunications link, backup servers, and security system.

*4. Why is system testing important? Name the types of testing and their relation to each other.*

System testing is important because there can be up to thousands of different pathways within a typical e-commerce site and you must make sure that customers can find what they want easily and quickly and, most importantly, that they can complete a purchase without a hitch. The types of testing that must be completed are unit testing, which involves checking each program module; system testing, which includes testing the site as a whole in the way a “typical” user might navigate and make requests for functionality; and acceptance testing, which requires the firm’s key personnel and managers to use the system to verify that the business objectives as originally conceived are being met.

*5. Compare the costs for system development and system maintenance. Which is more expensive, and why?*

The costs for system maintenance for an e-commerce site can run anywhere from 50% to 100% per year of the original systems development costs. For small sites the annual maintenance cost can parallel the development costs, with larger sites achieving some economies of scale. Maintenance is more expensive because e-commerce sites are always in a process of change, improvement, and correction.

E-commerce sites are, in fact, never finished. They are always in the process of being built and rebuilt.

*6. Why is a website so costly to maintain? Discuss the main factors that impact cost.*

Websites are so costly to maintain because code must be debugged; hyperlinks must be tested and repaired continually; emergencies must be handled; reports, data files, and links to backend databases must be maintained and updated as necessary. General administrative tasks of the site require attention including updating the products and prices. Changes and enhancements to the system are also continually being made so that the site is always adapting to changing market conditions. All of this requires a web team that includes programmers, designers, and business managers from the marketing, sales support, and production departments. This will ensure timely response to customer feedback and that the site is adequately monitored for correct prices and links with updated page display.

*7. What are the main differences between single-tier and multi-tier site architectures?*

Single-tier site architecture simply consists of a server machine running the basic web server software. Multi-tier site architecture, on the other hand, provides much more functionality by linking a web server layer that can include multiple web servers to a middle tier that includes many web application servers, which provide a wide variety of transaction processing tasks. This middle layer is also linked to a backend layer that includes existing databases, human resources systems, corporate applications, financial data, and enterprise systems. A multi-tiered site typically employs several or more physical computers each running some of the software applications and sharing the workload across many computers.

*8. Name the basic functionalities a web server should provide.*

The basic functionalities a web server should provide are:

* + Processing HTTP requests (requests for HTML pages).
  + Providing security services to verify the username and password or process the certificates and private/public key information required for credit card processing (Secure Sockets Layer/Transport Layer Security (SSL/TLS)).
  + Processing File Transfer Protocol (FTP) requests (transfers of very large files from server to server).
  + Providing search engine services.
  + Capturing data such as logs of visits, time, duration, and referral sources.
  + Providing e-mail services including the ability to send, receive, and store e-mail.
  + Providing site management tools to calculate and display key site statistics such as unique visitors, page requests, and the origin of requests, as well as to check the links on the site.

*9.**What are the main factors to consider when choosing the best hardware platform for your website?*

In choosing the best platform to use for your website, the main factors to consider are the anticipated number of simultaneous users who will likely visit your site, the customer user profile with their expected requests and behavior while at the site, and the nature of the content on your site. The more visitors you have, the greater the demand will be on your system. If the users will be viewing dynamic pages and large multimedia files, far more capacity will be required.

*10. Why is web server bandwidth an important issue for e-commerce sites?*

The factors discussed in question 9 will help to determine the telecommunications link you will need for your site. Web server bandwidth is another important consideration because the larger the bandwidth available, the more customers that can hit your site simultaneously. Most ISPs or other site-hosting providers are obligated to provide enough bandwidth so that your site can meet peak demands.

*11. Compare and contrast the various scaling methods. Explain why scalability is a key business issue for websites.*

To meet the demands for service at your site, you can scale your hardware vertically, scale your hardware horizontally, or improve the processing architecture at your site. You scale vertically by increasing the processing power of individual components, for example by upgrading the servers from a single processor to multiple processors. You can add up to 20 processors to a machine and also increase chip speeds. The drawbacks to this method are that it can become expensive to purchase new machines with every growth cycle, and that your entire site becomes dependent on just a small number of very powerful computers.

If you horizontally scale your site instead, you add multiple computers to share the workload and increase the “footprint” of the instance, for example adding multiple single processor servers to the site and balance the load among many servers. You can also create dedicated servers that only handle certain tasks such as HTTP requests or ASP pages, while others handle just database applications. This method requires the use of special load-balancing software to direct the incoming requests to the appropriate server. This is a less expensive method because you can often use older PCs that otherwise might be discarded. Furthermore, if one machine fails, there is a good probability that another one of the many other machines can pick up the load.

The third alternative, improving the processing architecture, is a combination of both vertical and horizontal scaling and system design changes. Scalability is a key business issue for websites because firms must be able to increase the size of their sites as demand loads increase, and they must be able to do so efficiently and cost effectively.

*12. What are the eight most important factors impacting website design, and how do they affect a site’s operation?*

The most important factors impacting website design are:

* Functionality: The site must have pages that load quickly, perform correctly, and send the user to the requested information about the product offerings.
* Informational: The site must have links that the customer can find easily to obtain information about the company and the products it offers.
* Ease of use: The site must have a simple foolproof navigation scheme.
* Redundant navigation: The site must have alternative paths to reach the same content.
* Ease of purchase: There should be no more than one or two clicks required for the purchasing procedure.
* Multi-browser functionality: The site should work with the popular browsers.
* Simple graphics: The site should not use distracting graphics and/or sounds that the user cannot control.
* Legible text: The site should avoid the use of backgrounds that distort text or make it difficult to read.

Failure to pay attention to these factors will adversely affect the operation of a site because users will find the site frustrating to navigate and view, they will have difficulty obtaining information about the products, and they will determine that making a purchase will be far too complicated.

*13. What are Java and JavaScript? What role do they play in website design?*

Java is a programming language that allows programmers to create interactivity and active content on the client machine. It alleviates the load on the server because the Java programs or applets are downloaded to the client and executed on the client’s computer. A Java Virtual Machine (VM) is now included in all browsers that will send a request to the server to download and execute the program and allocate page space to display the results. Java can be used to display interesting graphics and create interactive environments such as calculators or calendars. However, different vendors have produced different versions of the language and today many firms will not allow Java applets through their security firewalls. Many Java applets crash or perform poorly, wasting system resources on functions that are sometimes not very important and that do not add much to the page design. Hence, they are not widely in use today by corporate websites.

Conversely, JavaScript is a programming language that is used to control the objects on an HTML page and handle interactions with the browser. It is commonly used to control verification and validation of user input, such as confirming that a valid phone number or e-mail address has been entered. It is much more acceptable to corporations because it is more stable and is restricted to the operation of requested HTML pages.

*14. Name and describe three methods used to treat customers individually. Why are they significant to e-commerce?*

The primary method for treating customers individually through personalization and customization is the placement of cookie files on the user’s client machine. Cookies can be used to store information about the customer such as their customer ID, a campaign ID, and their prior purchases from the site. When a user returns to a site, the prior viewing and purchasing behavior can be accessed from a database, and the customer can be greeted by name and related products can be recommended. Other tools that enable personalization and customization include tools for interactivity and active content, such as CGI scripts, Active Server Pages, and Java Server Pages. Personalization and customization are significant to e-commerce because they can potentially make it nearly as powerful as a traditional marketplace and perhaps even more powerful than direct mail or shopping at an anonymous suburban shopping mall. Speaking directly to a customer and tailoring a product to that customer are potentially powerful marketing tools that could help to increase sales and revenues.

*15. What are some of the policies e-commerce businesses must develop before launching a site and why must they be developed?*

Some of the policies that an e-commerce business site must develop prior to launching are a privacy policyand accessibility rules. The privacy policy is a public statement detailing to customers how the personal information that is gathered at the site will be treated. Accessibility rules are a set of design objectives that ensure disabled users can effectively access a site.

*16. What are the advantages and disadvantages of mobile first design?*

Mobile first design has several advantages. Instead of creating a full-featured design for a desktop website that then needs to be scaled back, mobile first design focuses on creating the best possible experience given mobile platform constraints and then adding back elements for the desktop platform, progressively enhancing the functionality of the site. Proponents of mobile first design argue that it forces designers to focus on what is most important, and this helps create a lean and efficient mobile design that functions much better than a design that begins with a traditional platform that must be stripped down to work on mobile. Mobile first design is not without its challenges, however. It can be more difficult for designers who are more comfortable with the more traditional process.

*17. What is the difference between a mobile web app and a native app?*

A mobile web appis an application built to run on the mobile web browser built into a smartphone or tablet computer. In the case of Apple, the native browser is Safari. Generally, it is built to mimic the qualities of a native app using HTML5 and Java. Mobile web apps are specifically designed for the mobile platform in terms of screen size, finger navigation, and graphical simplicity. Mobile web apps can support complex interactions used in games and rich media, perform real-time, on-the-fly calculations, and can be geo-sensitive using the smartphone’s built-in global positioning system (GPS) function. Mobile web apps typically operate faster than mobile websites but not as fast as native apps.

A native appis an application designed specifically to operate using the mobile device’s hardware and operating system. These stand-alone programs can connect to the Internet to download and upload data, and can operate on this data even when not connected to the Internet. Download a book to an app reader, disconnect from the Internet, and read your book. Because the various types of smartphones have different hardware and operating systems, apps are not “one size fits all” and, therefore, need to be developed for different mobile platforms. An Apple app that runs on an iPhone cannot operate on Android phones. As you learned in Chapter 3, native apps are built using different programming languages depending on the device for which they are intended, which is then compiled into binary code, and which executes extremely fast on mobile devices, much faster than HTML or Java-based mobile web apps. For this reason, native apps are ideal for games, complex interactions, on-the-fly calculations, graphic manipulations, and rich media advertising.

*18. In what ways does a hybrid mobile app combine the functionality of a mobile web app and a native app?*

A hybrid apphas many of the features of both a native app and a mobile web app. Like a native app, it runs inside a native container on the mobile device and has access to the device’s APIs, enabling it to take advantage of many of the device’s features, such as a gyroscope, that are normally not accessible by a mobile web app. It can also be packaged as an app for distribution from an App store. Like a mobile web app, it is based on HTML5, CSS3, and JavaScript, but uses the device’s browser engine to render the HTML5 and process the JavaScript locally.

*19. What is PHP and how is it used in web development?*

PHP is an open source, general purpose scripting language that is most frequently used in server-side web applications to generate dynamic web page content, although it can also be used for client-side graphical user interface applications. PHP is also a part of many web application development frameworks, such as CakePHP, CodeIgniter, and others, and is also part of the LAMP (Linux, Apache, MySQL, and PHP) open source web development model for building dynamic websites and web applications. According to W3Techs, PHP is, far and away, the most commonly used server-side scripting language (used by over 80% of the websites whose server-side programming language it was able to identify).

*20. How does responsive web design differ from adaptive web delivery?*

Responsive web design (RWD)tools and design techniques make it possible to design a website that automatically adjusts its layout and display according to the screen resolution of the device on which it is being viewed, whether a desktop, tablet, or smartphone. RWD uses the same HTML code and design for each device, but uses CSS (which determines the layout of the web page) to adjust the layout and display to the screen’s form factor. One problem with RWD, particularly if not coupled with mobile first design, is that the responsive website still has the size and complexity of a traditional desktop site, sometimes making it slow to load and perform on a mobile device. Adaptive web design was developed to deal with this issue. With adaptive web design (AWD) (sometimes also referred to as adaptive delivery or responsive web design with server-side components (RESS)), the server hosting the website detects the attributes of the device making the request and, using predefined templates based on device screen size along with CSS and JavaScript, loads a version of the site that is optimized for the device. AWD has many advantages compared to RWD, including faster load times, the ability to enhance or remove functionality on the fly, and typically a better user experience, particularly for businesses where user intent differs depending on the platform being used.

**Projects**

*1. Go to the website of Wix, Weebly, or another provider of your choosing that allows you to create a simple e-tailer website for a free trial period.* *Create a website. The site should feature at least four pages, including a home page, product page, shopping cart, and contact page. Extra credit will be given for additional complexity and creativity. Come to class prepared to present your e-tailer concept and website.*

Students should be able to build a basic website using the tools provided on these sites. Note that it may not be possible for students to build at least four pages (depending on the free functionality provided by these two sites at the time this project is assigned), so credit should not be deducted if that is, in fact, the case.

*2.* *Visit several e-commerce sites, not including those mentioned in this chapter, and evaluate the effectiveness of the sites according to the eight basic criteria/functionalities listed in Table 4.11. Choose one site you feel does an excellent job on all the aspects of an effective site and create an electronic presentation, including screen shots, to support your choice.*

The purpose of this project is to extend the critical thinking skills of students as they examine websites. For each factor listed on Table 4.11, the students should evaluate the website for effectiveness of design. For example, the students should evaluate how clearly the digital catalog conveys the essence of each product using graphics, or other methods such as streaming video, and how effectively products are portrayed in textual descriptions. Students can choose sites at which they are shopping, or they can simply browse, but they should go through the steps of executing a transaction so that they can evaluate the shopping cart/payment system and ease of purchase. They should also navigate to multiple pages at each site so that they can evaluate the ease of use and redundancy of navigation. The presentation might include screen shots of product graphics, navigation bars, and pages from the site displayed in multiple browsers.

1. *Imagine that you are in charge of developing a fast-growing startup’s e-commerce presence. Consider your options for building the company’s e-commerce presence in-house with existing staff, or outsourcing the entire operation. Decide which strategy you believe is in your company’s best interest and create a brief presentation outlining your position. Why choose that approach? And what are the estimated associated costs, compared with the alternative? (You’ll need to make some educated guesses here—don’t worry about being exact.)*

The purpose of this project is to get students to begin to consider the managerial decision-making process. If they choose to build in-house, they might mention such factors as an in-place staff of professionals who are trained for this task including graphic artists, web designers, programmers, and project managers. They may also posit that they are prepared to purchase a top-of-the-line prepackaged site-building tool that will be scalable as the firm expands its customer base. They may also argue that their firm sells a highly specialized product so that the need for a customized website is high or that their staff, which is already highly trained, will be able to build a site that does exactly what the company needs. Moreover, they may believe that the staff who will participate in the building of the site will be able to change the site more rapidly to adapt to any changes in the business environment. Students who opt for outsourcing might mention such factors as the risks involved in building such complex features as shopping carts, credit card authentication and processing systems, inventory management systems, and order processing systems. They may also argue that the risk of ending up with a poorly functioning site is just too great, and that staff will face a long, difficult learning curve. Costs for building in-house might include the salaries of any additional professionals who will have to be hired, the cost of a prepackaged site-building tool, or the costs of additional software or technology that will have to be purchased to build credit card authentication systems. Costs for outsourcing may include an expensive site-building package and costs for hiring an outside vendor to modify the package.

*4. Choose two e-commerce software packages and prepare an evaluation chart that rates the packages on the key factors discussed in the section “Choosing an E-commerce Software Platform.” Which package would you choose if you were developing a website of the type described in this chapter, and why?*

The best way for students to approach this project is to choose two of the e-commerce suites and conduct an online research study to find articles in the popular and technical press that evaluate the products based upon the key factors listed in the chapter. Reading articles and comparisons of the suites will give students insight into just how difficult the process of choosing an e-commerce suite can be for a manager. Answers, of course, will vary according to the suites chosen and the opinions of the authors of the articles collected. One possible comparison based upon product evaluations from various sources is:

(Table is based on a scale of 1–10)

|  |  |  |
| --- | --- | --- |
|  | Sitecore Commerce  Server | IBM WebSphere Commerce  Express Edition |
| Functionality | 8.5 | 7.8 |
| Support for different business models | 7.5 | 8.0 |
| Business processing models | 9.2 | 7.5 |
| Visual site management tools | 9.0 | 8.0 |
| Performance and scalability | 7.5 | 8.2 |
| Connectivity to existing business systems | 7.5 | 9.0 |
| Compliance with standards | 9.0 | 8.0 |
| Global and multicultural ability | 8.0 | 9.0 |
| Local sales tax and shipping rules | 8.0 | 8.0 |

IBM’s WebSphere Commerce Express Edition provides templates, Set Up Wizards, and a large set of store and catalog editing tools. It offers a scalable architecture and extensive customizability, and can support many different business models, from B2C, B2B, and C2C, as well as electronic downloads. It offers good multilingual support, and provides good integration with backend systems, including existing DB2 and Oracle databases. Unlike Microsoft’s product, it can be run on many different server platforms, including Linux and Windows. However, it does not appear to have as many high-end reporting tools as Microsoft’s product.

Sitecore Commerce Server (formerly Microsoft Commerce Server) is also extensible, and includes many pre-defined reports that can be run to analyze site activities and product sales data. It has very good analysis tools through SQL server data mining. Its main drawback is that it only runs on web servers running Microsoft Windows Server. It also is customizable, but to do so, knowledge of Microsoft’s Visual Studio.NET tools is required.

*5. Choose one of the open source web content management systems such as WordPress, Joomla, or Drupal, or another of your own choosing and prepare an evaluation chart similar to that required by Project 4. Which system would you choose and why?*

The first task students must perform to complete this project is to choose an open source web content management system. Once they have done so, the next step, as with Project 4, will be to conduct an online research study to find articles in the popular and technical press that evaluate the product. Answers will vary according to the system chosen and the opinions of the authors of the articles collected. Student evaluation charts should cover the following areas and explain whether they would purchase the system and why or why not:

* Community features
* Shopping cart
* Search engine
* Forum creation
* Ability to create blogs
* Multimedia capability
* Templates/themes
* Document management features
* Content management features
* Documentation for system
* Ease of use/learning curve required
* SSL/TLS security
* Internationalization capabilities

**Companion Website, Learning Tracks, and Video Cases**

You can also direct your students to the Companion Website for the book, located at [www.e-commerce2018.com](http://www.e-commerce2018.com). There they will find a collection of additional projects and exercises for each chapter; links to various technology tutorials; information on how to build a business plan and revenue models; information on careers in e-commerce, and more. Learning Tracks that provide additional coverage of various topics and a collection of video cases that integrate short videos, supporting case study material, and case study questions are also available for download from the book’s Online Instructor Resource Center at [www.pearsonhighered.com/irc](http://www.pearsonhighered.com/irc). Video Cases for this chapter include:

* Video Case 4.1 WL Gore Expands Using Demandware
* Video Case 4.2 National Kidney Registry Turns to Rackspace for Managed Hosting