The Modern Difficulties for Developing an E-Commerce Website in 2022

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Introduction

The increase in online shopping due to the Covid-19 pandemic has meant that the standard in which people expect to receive when shopping online has also increased and with high expectations comes greater skills and qualifications needed to meet them. I believe that due to the complexity, professional expectations, and skills required that a single business owner could not produce their own suitable e-commerce website to compete with today's expectations.

The first introduction to e-commerce was a lot further back than you would think. In fact, the first e-commerce shop predates the advent of the World Wide Web and was operated using a dial up bulletin board system (Ang 2021a). Boston Computer Exchange (BCE) was the first online marketplace that allowed for people to buy and sell used computers (Ang 2021b). The only drawback to this design was the restricted technology and the effort required to complete a sale or a purchase.

By the 1990's the Internet has already established itself as a major global centre for connection and communication. In 1994, Netscape's Navigator and Mosaic were the two most widely used web browsers, with around ten million unique visitors each month. In the same year, Jeff Bezos established Amazon, which now serves as an online marketplace for hundreds of thousands of unique goods. He launched his own e-commerce website in 1999 after the company quickly expanded to become among the biggest in the world. After 30 days of operation, it was shipping books to forty-five different nations, and after two years it surpassed all other retailers in the US. Fast forward to 2022, Amazon now employ more than 70,000 people in tech roles and around 35,000 of them are software engineers.

Up until this point, if you were a developer creating websites, you need only know HTML, or XML to create a website. Developers didn't design websites to suit the visually impaired, or the colour blind. They simple developed what worked for them. Design and User Experience had not received much consideration or investigation; therefore, web developers

were not required to know any UX/UI skills. That is, until 1995, when Donald Norman, Jim
35   Miller, and Austin Henderson from Apple Computer gave a presentation at CHI '95 Mosaic of
Creativity called What You See, Some of What's in the Future, and How We Go About Doing
It: HI at Apple Computer. This presentation introduced the concept of analysing your target
audience and designing to their needs to create a product that was easy to understand and
even easier to sell. Rather the goal was to make a service or product that was almost intuitive
40   for the user to understand and learn. The same way of thinking was depicted in Don't Make
Me Think (Krug 2000). Krug discusses the idea that a well-designed computer programme or
website should allow users to complete their intended tasks in the simplest, most
straightforward manner possible.

      Microsoft started to sell the Zune handheld devices in 2009 and the website developed
45   for this product was a far stretch from what people were used to at that time. Its flat design,
contrasting colours and use of imagery clearly depicted a website that was modern and stylish
which perfectly represented the product that they were selling (Web Design Museum 2009).
This sleek design matched perfectly with the futuristic theme that the product itself was trying
to portray and suited the consumers idea of what to expect when they got their hands on the
50   device.

Figure 1 – Image of Zune Website (Zune 2009)

Discussion

Web developers in the 1990's were required to have known either HTML, XML, or XHML and maybe CSS. They could use C++ for the backend but primarily a markup language and CSS were all that was required to produce a sufficient website at the time. With the release of JavaScript 1.0 in 1995 it allowed developers to create interactive websites using an object-oriented language. When we compare this to the average skills that a graduate will acquire after completing an honours degree in computing science, it demonstrates the significant increase in expectations of what a developer's skills must be to work in this current day workforce. Developers can no longer rely solely on a handful of programming languages, they must be well versed in critical thinking, problem solving, design awareness, frameworks, developing trends such as PWA's and more. When we investigate the skills, a professional developer possess it stems down to being able to make the important decisions such as selecting the correct language to use on a project and knowing what works and what weaknesses might arise in future development. Being able to implement new and evolving technology to help ease workload such as AI Chats for customer service will allow a website to evolve with the times to meet these ever-growing expectations. Understanding the end goal of a project or a website is core in making the right decisions at the beginning. These are challenges that most graduate developers will struggle with for years when entering the industry, so imagine the overwhelming sense of difficulty to someone who has never been formally taught how to code or design a website would feel. There are options however that will cut out some of the work for absolute beginners.

For non-coding or design skilled people, start-ups can use Shopify, WordPress, WooCommerce and other e-commerce software solutions which provide the tools to allow them to setup a website and theme it to their liking without the need to understand domain names, security certificates, and the other must haves that websites need. They can manoeuvre their products around, setup sections for banners and graphics as well as managing uploads of product descriptions and managing stock levels. The software however

80   doesn't teach the users about the attributes needed to create a great professional website. The need for well thought out UX/UI design doesn't come with the click of a button. This misconception that simply having the tools will allow for someone to create a striving business that competes against larger brands is why 90% of e-commerce businesses started, end up failing (Gauthier *et al.* 2019). Simply putting a hammer into someone's hand does not make

85   them a carpenter.

Developers are known to be mathematical in the sense that when working with websites, there are varying factors such as screen size, orientation of the device and image sizes and more. Three types of math that a good developer will poses are arithmetic, algebra and boolean logic. Arithmetic math will be used to calculate varying sizes of elements on the

90   website. Algebra functions will then take in the value and apply the equation. For example, an image might need to be 100% of the screen size – 30px, therefore it would require a variable with the screen size value inside that and then apply the -30px to that leaving the developer with the desired result. Boolean logic is equally just as important, especially when developing a website for e-commerce as these booleans will be used to trigger certain events. If the

95   customer orders a product, then after payment has been received the boolean logic will tell the server to send out an email with the order information. This is just one example, however, that level of logic is fundamental in any developer's role. Being able to break down big problems into solvable smaller problems is what makes a good developer.

An IDE (Integrated Development Environment) is a developer's best friend. There are

100 many diverse types, and they all look different, but ultimately, they all do the same thing, which is to allow the developer to programme. Some IDEs have unique features inside such as IntelliSense, which predicts what you are typing and makes suggestions on how to finish it. Most of them will also have a debugger which allows for step-by-step analysis of the code, and some have very little so that they can be lightweight and straightforward. Developers use

105 different IDEs for different languages, for example a popular choice for HTML programming would be Visual Studio Code. IDE's take some time to understand, and different languages

can sometimes only be written in certain IDE's. It is important for a beginner to get a customed to the IDE that they will be using.

HTML is used by 94.8% of websites worldwide and is the foundation of the website (W3Techs 2022a). Here the developer implements the core design of the website using tags and attributes to make up various parts of the website such as the navigation, the body of the website and the content that is situated inside it as well as the footer which can contain all the information a consumer might require regarding business address, contact information and legal documents such as cookie policies, returns, shipping and GDPR. CSS is used by 94.8% of websites to add styling to the website (W3Techs 2022b). Developers will use this to add colouring to the website, change font size and font types, creating grids and flex boxes for proper organising and creating media queries which will account for multiple screen sizes and devices. Since Q1 and Q2 of 2022, 58.99% of global website traffic worldwide is mobile devices (Statista 2022). Developers should be very aware that having one layout for one static screen size will not work in 2022. JavaScript is used by 97.4% of websites to add extra functionality to websites (W3Techs 2022c).JavaScript is the first language we have discussed that uses an object-oriented programming model which makes it more complicated to learn as there are more complex methods and classes behind it.

The introduction of libraries to web development is fantastic way of increasing productivity. Bootstrap is a fitting example of a library that was created with the sole purpose of increasing fast turnaround designs for websites geared towards an e-commerce design. It can provide template code for various things such as customer reviews, product carousel, hero banners and other components that an e-commerce website would need. It is also compatible with other libraries such as Angular which is a development platform built on TypeScript (Angular 2022). Angular allows developers to create a component-based framework for scalable web applications. This is important in e-commerce as it means the developer can return variables with the customer's name and email address which can be inputted into a purchase receipt or invoice upon completing a purchase.

Web developers must have a place to retain product and customer data and the best

135   place to do this is a database. There are various databases available such as Amazon Web

Services, Oracle, MySQL, MongoDB etc but regardless of which one is chosen it is important

that security is the main goal. A customer's information is personal to them and if there were

to be a breach of that information, then that business is liable for damages and a hefty fine will

be imposed on them for that information getting out.

140   A designer looking to create an online presence in 2022 needs to understand their

audience. Who is it that they are looking to sell to? Are they older, younger, or both? Are they

using mobile devices, computers, iPads, or tablets? Where are they situated, locally or

internationally? These are questions that should be answered before beginning to programme

an application. Finding out this information and incorporating it into the wireframe and

145   prototype will mean that the website is fulfilling its consumers needs and expectations.

Compared to the earlier years of web development, more research has been put into

behavioural studies and marketing which has produced clear results that to create a reliable

website, you need to account for the experience that the consumer is having while browsing

your website. User Experience is a task that requires reiteration upon every choice. Testing to

150   see if the current layout works and how consumers feel is how a well refined UX is created.

UX is one of the hardest jobs to do in any profession. Understanding the strengths and

weakness of consumers is vital when approaching this task. Having a well-researched target

audience will make the UX design significantly more approachable than going at it blind.

A firm understanding of the prototyping stage will allow a designer to develop the base

155   layout of the website and all the subsequent pages that are a part of it. Creating an organic

flow will make sure that users are able to seek out the relevant information quickly and

confidently on the website. If a designer were to neglect the User Experience, then it is 70%

more likely that that e-commerce website will fail (Gajic 2022). It is then their job to scope the

project in and begin designing the components such as buttons, menu's, forms, and other

160   interactive sections on the website. By focusing on increasing the quality of UI on the website,

it will increase the conversion rate by 200% (Anic 2022). To create an interactive prototype with the previously created screens, a designer will need to use prototyping software to do this. There are loads of options when it comes to choices, popular options include Figma which is free to use, and there is also Adobe XD which is also very popular but requires a license.

By using one of these applications, designers can link all the screens together and provide an impressive looking prototype that will display all the functionality required to make a good judgement on whether anything needs revisited for editing. The entire design process should be accounted for and prototyped before programming begins. After completing and reviewing the prototype a designer could ask some friends, family, or the public to complete some basic tasks and events such as trying to find the product page or accessing the customer account panel. This is referred to as testing. Depending on what stage of the project you are on it can either be alpha or beta testing. Alpha testing is conducted internally, while beta tests are conducted on the intended audience. This can be done using paper or digital means, it is a fantastic way of seeing if the User Experience is positive, or if something needs reworked or redesigned before submitting the final design for development.

Once happy with the prototype, development begins. As the development process begins this means that a developer begins working on their allocated jobs and tasks. Larger companies will assign tasks to the developer and tells them what programming language they are using and if there is any external libraries as well. An individual developer does not have this luxury and will be required to research into what the best programming language is for the job and if any external libraries should be used. This is vital part of the website's lifecycle. Spending time developing a website with the wrong code base could set back a developer many weeks or months depending on how much work has been completed. When choosing a programming language, things to consider would be whether you are hosting your own items in your database, if so, a language that works well with MySQL or Oracle would be favourable. Since this is an e-commerce website, looking into an external library such as Angular could help speed up the development process.

Once the languages and libraries have been selected and the coding completed and the site is fully functional and live, the designer then needs to populate the store with the relevant items. It is important that when producing product photos that they are high quality and every product photo either has the same theme or connection to the website. It is important to remember that as a designer we do want great resolution images and assets, but you must be mindful of website load times. Customers make their first judgement within 0.05 seconds on whether they want to continue to stay on your page (Lynkova 2022d). It is important that not only do designers provide consumers with excellent quality product photos, but that the website load times are low, and the website performs as the consumer would expect. On average, 47% of website visitors will leave the site within 2 seconds or less if it has not loaded (Lynkova 2022b). That is why it is so important to produce both a lower sized file for product overview purposes and then after the users has selected the product, display a higher resolution product photo then.

BARRACUDA COLORADO 27.5" WHEEL DISC BRAKE ORANGE
€359,99

CUBE AIM BLACK/ BLUE 2022
€599,00

CUBE ACCESS WS BLACK/BLUE 2022
€599,00

FORME CURBAR 3 RED
€599,00

ORBEA ONNA 50 VIOLET BLUE / WHITE
€629,00

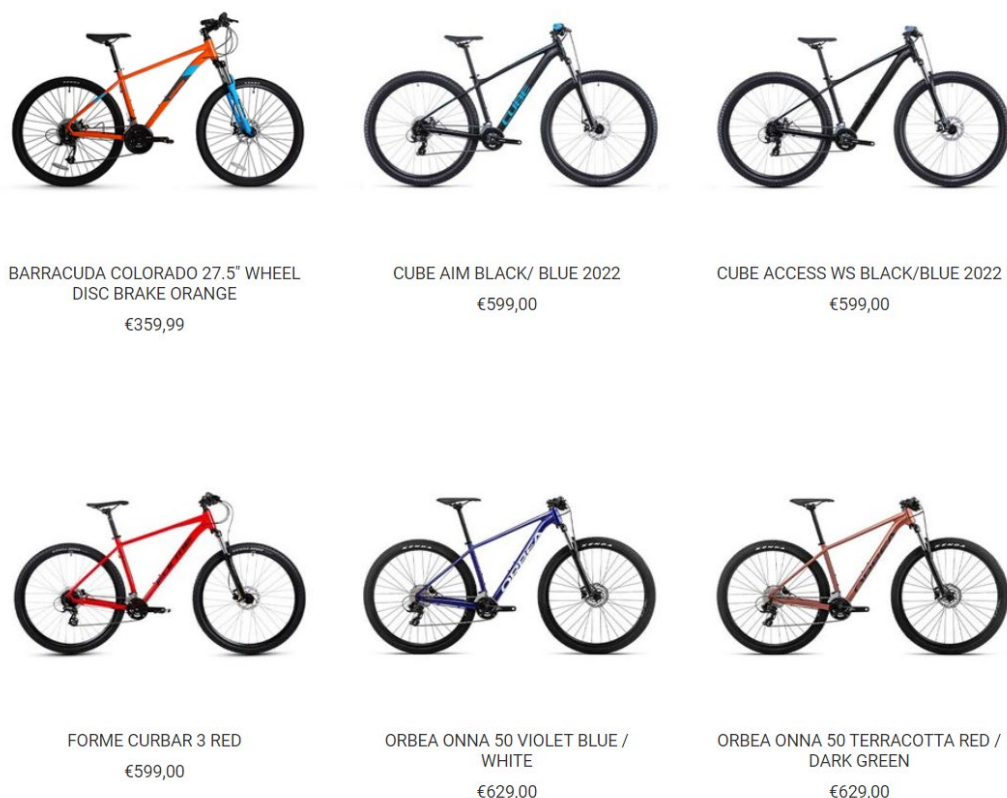ORBEA ONNA 50 TERRACOTTA RED / DARK GREEN
€629,00

Figure 2 – (Craig 2022a)

As we can see from Figure 2, although all the bicycles are a different brand and the imagery is supplied from different manufacturers, the web designer has edited the photos to contain a drop shadow below all the bicycle wheels. It is hard to tell that the product images are edited since they all look the same to the naked eye, but it can be seen by the fact that some of the shadows are wider and darker underneath some of the wheels. This means that shadows have been added in post-production, most likely using a photo editing software suite such as Adobe Photoshop or GIMP.

In addition to product photos, 54% consumers expect a tailored experience when they shop online (Lynkova 2022c). To satisfy their expectations, designers must strive to create custom graphics that point the consumer to the feature that they want to find. Figure 3 below perfectly demonstrates the use of custom graphics. The banner is eye catching and uses contrasting colour to bring the viewer into the text which clearly points out that it is in relation to the "Christmas Club" users. Users of this feature can then make quick and secure payments by clicking the "Easi Payment" button located on top of the banner at the bottom left.

Figure 3 – (Craig 2022b)

When looking to upskill it is important to factor in circumstances such as time, difficulty, and finances. If an unskilled or untrained person wanted to attend a computer science degree in university or college they would complete their studies in 3 to 4 years if it were a full-time student or 4 to 5 years for a part time course *(Indeed Editorial Team 2021)*. Can a mature student that is running a full-time retail store also be able to attend college while possibly managing a family? These courses tend to be around 7-8 hours a day with a 2–3-hour self-learning period in the evening for someone looking to really drive in the lessons they have been taught that day. That is a range of 40-50 hours per week spent learning coding. That is not contributing to the other skills an e-commerce business start-up should possess such as UX, UI, photo editing, illustration, wireframing, prototyping, video editing or motion graphics. It's important to remember the difficulty of learning programming. 55.4% of computer science students drop out of the course before completion *(HEA 2022)*. This is a staggeringly high ratio and it's due to the commitment that is involved when learning coding, not everyone has the time to put in the required study. Having the financial aspect to deal with can also be a heavy factor in deciding to go back to college to upskill. An EU student will have to pay student contribution fees which average around €3,000 per annum but can vary depending on government input. If they are not an EU student, these costs can go up as far as €10,000 per annum. The skills a person will learn within their time at college is priceless if they wish to run their own e-commerce business. Within them 3-4 years a student will be taught the fundamentals of web development which will cover HTML, CSS, JavaScript, and jQuery. They will then cover server-side programming such as PHP, Node.js or AJAX along with maybe Python. These are vital for creating a good website.

Completion Rate Ready Reckoner

55.4%
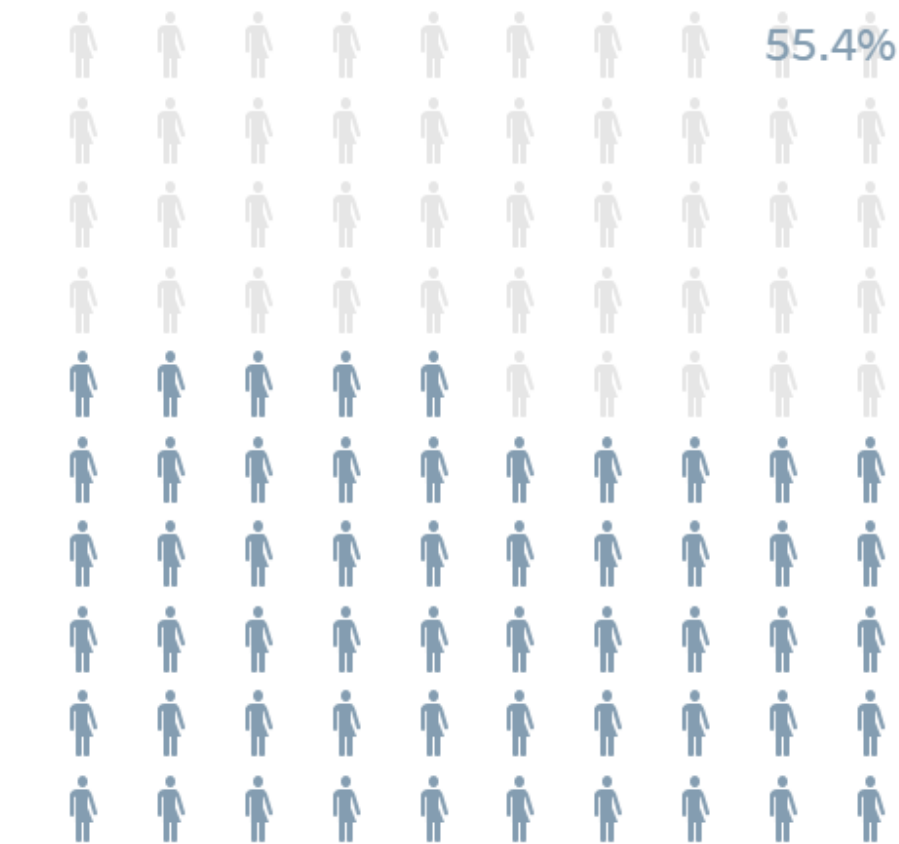
(HEA 2022) Figure 1 - Completion Rates, per 100 Students

Conclusion

220   Modern, sleek, fast, efficient, intelligent, easy to use, unique, are all words that are thrown around when we talk about great websites. Is this something that is achieved easily and without thought? Absolutely not. To create a great website that could rival that of Nike or Puma would require more than just experience in both web design and web development. It would require an entire team of trained professionals in branding, marketing, and economics.

225   An e-commerce start-up business would require that the developer have a clear and logical approach to the development of the website and the technologies that it would incorporate for it to have any chance of being successful. Regardless of the aid that e-commerce software solutions such as Shopify provide, I believe that it would take several years and several failed projects to gain the necessary technical, soft, and hard skills required

230   to build a successful business. It is also very dangerous to setup a custom developed website without the correct security. A breach of data could result in customer debit/credit card information being lost, as well as addresses and other personal information that is protected under the GDPR laws. Any breach of GDPR will result in a possible legal issue that could jeopardise the business.

235   I believe that due to the commitment it requires to attend a computing science course and the financial costs that it would incur that this would be enough to put a vast majority of start-ups of the idea of upskilling. I believe this because of the sacrifices that it would bring on in relation to family time, time spent managing their current business and the financial burden all that would bring with it. I also believe that due to high percentage drop out rate that

240   statistically speaking it would be unlikely for a mature student to go back to higher education and complete their course.

        If an e-commerce business was setup regardless of current skills and qualifications, even with a great product it would require professional imagery and assets to gain the attention

and retention of users. Having not been taught how to use any Adobe software or product

245   photography then I fail to see how they could produce the professional assets that consumers

would expect to see. With no qualifications the site would surely have issues that would

become frustrating to users and would in time fail due to bad conversion rates. It is an

unfortunate circumstance that such few businesses can become profitable and successful

even with the help of online tools and software.

250   Amazon, Nike, Puma, Apple, Google, and many other industry leading companies

have gathered some of the most intelligent and creative people from around the planet to work

for them. Each employee has presumably spent years in education as well as crafting their

skills to suit their specific role in the company. They have worked on challenging projects,

made mistakes, and learnt from them. This is why I believe that a single business owner could

255   not produce their own suitable e-commerce website to compete with today's expectations.

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315 **Document Statistics**

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