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

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**Introduction**

E-commerce is the electronic purchase or sale of goods through online stores or the Internet. The increase in online shopping has meant that the standard in which people expect to receive when shopping online has also increased and with high expectations comes higher skills and qualifications to meet them. I believe that in the current era of web development that no one person can simply decide to create an e-commerce store and expect it to rival that of big companies with teams of trained professionals.

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 (Ang 2021) and was operated using a dial up bulletin board system. Boston Computer Exchange (BCE) was the first online marketplace that allowed for people to buy and sell used computers. 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. Around 10 million unique visitors each month used Netscape's Navigator and Mosaic, the two most widely used web browsers in 1994. 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 45 different nations, and after two years it surpassed all other retailers in the US. The idea of "one-click" shopping was launched by Amazon in 2002, enabling shoppers to purchase goods without looking elsewhere.

As the internet developed and grew so did the need for Web standards. Tim Berners-Lee founded an international organization called World Wide Web Consortium (W3C) for which its goals were to create a standardized way of programming for HTML, XHML, XML and CSS markup languages. They also aimed to increase knowledge and development of Web Accessibility Rules (WCAG).

Up until this point, if you were a developer creating websites, you need only know HTML, or XML to create a full website because websites were constructed mainly out of tables that had paragraphs inside them. Design and User Experience hadn't 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 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 than designing it your way and being required to demonstrate it. Rather the goal was to make a service or product that was almost intuitive for the user to understand and learn. The same way of thinking was depicted in Steve Krug's Don't Make Me Think (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, without having to think about how to do so.

Websites during the 1990’s to the 2000 era were made with the purpose of hosting and displaying information. Was this information easy to dissect and pick apart? No, most websites had large archives of text-based documents that had blue web links inserted throughout and users must have been overwhelmed with such a large amount of visual inconsistency upon loading the site. This all begin to change around the early 2000’s when developers where now thinking more of the design and user experience of their websites.

Microsoft started to sell the Zune handheld devices in 2009 and the website developed 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. 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 device.

Graphical user interface, website

Description automatically generated

Figure

Since Covid-19, there has been a massive increase in online sales, and websites that neglected their UX/UI design have been forced to either redesign or risk losing customers to better and more consumer-friendly e-commerce websites. We are surrounded by e-commerce websites that offer us access to food, clothing, and a wide range of other products. They offer us these products using web analytics so we can be sure that the products we are being suggested are of relevance to what we want at the time. They provide us with fast and simple checkout systems so that we can order our goods quickly and easily. So, what skills must a developer have in 2022 to develop a modern e-commerce presence to rival that of such big companies and to meet the high expectations set by consumers?

**Discussion**

Web developers in the 1990’s were required to have known either HTML, XML, or XHML and maybe CSS for styling background colours. 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.

With the increase in programming languages, web server providers, frameworks and complexity of websites and web applications in this modern era, it simply is not enough to know three basic languages like developers did when the World Wide Web was introduced.

Let us look at what programming languages Amazon use for their e-commerce platform and compare them to when it was first developed. Currently Amazon use a mix of Python, Java, JavaScript, HTML, CSS, React, Angular, R Programming, Kotlin, Rust, C#, SQL and have a large C++ codebase that is not used much anymore (Cheever 2011). That is a total of thirteen languages that are used for various tasks in Amazon. When Amazon first initially launched, all the coding was done using C, a couple of years later C++ replaced C when it released. They also used HTML, CSS.

Now, no one developer is expected to be an expert in all these languages, but if a website is to even compete alongside the likes of larger brands such as Amazon, Nike, Under Armour etc then the developer will need to know at least HTML, CSS, JavaScript, some external library such as React or Angular and SQL for handling product and customer data storage.

An IDE (Integrated Development Environment) is a developer’s best friend. There are 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 different IDEs for different languages, for example a popular choice for HTML programming would be Visual Studio Code.

HTML is used by 94.8% of websites worldwide and is the foundation of the website (W3Techs 2022 a). 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 2022c). 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 2022a). 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 customers 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 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.

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 cannot rely on efficient coding alone, you also need to account for the experience that the consumer is having while browsing your website. This was where the introduction of User Experience became apparent. It is critical to allow users to achieve what they want without too much thought process being used. (Krug 2000)

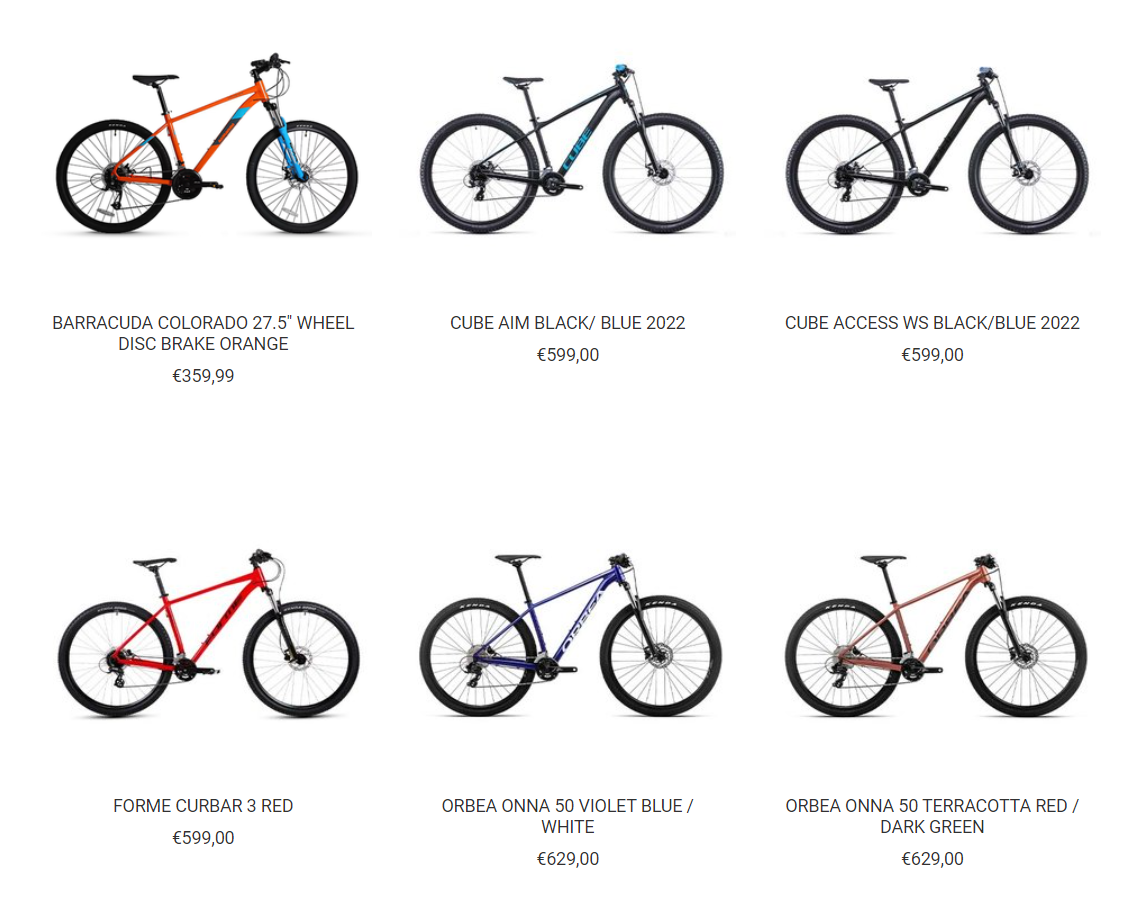
As hard as it is to learn how to confidently programme in multiply languages, it is not enough to simply know how to programme, a modern-day developer will need to know how to structure their website and design it to suit the needs of their consumers and users. Let us look at what is to be expected of someone who wants to create an online e-commerce shop from scratch and the skills and tools required to do so. The words designer and developer are going to be used interchangeably from this point onwards because in this modern era of web development, if you want to compete with larger brands then you need to be able to take on both roles and learn both a designers set of skills as well as a developer’s skillset.

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

A firm understanding of the prototyping stage will allow a designer to develop the base 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 interactive sections on the website. By focusing on increasing the quality of UI on the website, it will increase the conversion rate by 200% (Lazar 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, you 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 great 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 2022a). 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 2022). That is why it is so important to product both a lower sized file for product over view purposes and then after the users has selected the product, display a higher resolution product photo then.



Figure

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, consumers expect a tailored experience when they shop online (Lynkova 2022). 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.

A picture containing shape

Description automatically generatedFigure

For designers looking to create custom graphics, then they should use a vector-based illustration application like Adobe Illustrator, which can support the exporting of SVF and raster type files such as PNG or JPEG. SVGs (Scalable Vector Graphics) are smaller in size than most regular raster image type such as PNG or JPEG and can be scaled up in size without losing quality. When using SVG images, designers can be confident in knowing that their website complies with the standards set out by the W3C. SVG files do not work as well for realistic photos as unlike the traditional PNG file so knowing when to use them is important. SVGs are also great for using in animations or small motion graphics which can be achieved using CSS or JavaScript.

If a designer wanted to do the animation or motion graphics offline using software, then they could use Adobe After Effects. Adobe After Effects it a post-production video editing software that can create anything from simple animations to advanced motion graphics. By creating a video and displaying It as a background as opposed to a normal static image, conversion rates can be increased up to as much as 138% (Lynkova 2022b).

The average completion time of a computer science course is 3 years for a full-time student and 4 years for a part time student looking to gather a level 7 bachelor’s degree (Indeed Editorial Team 2021). Within them 3-4 years a student will be taught the fundamentals of web development which will cover HTML, CSS, JavaScript. They will then cover server-side programming such as PHP, Node.js or AJAX along with maybe Python. For their object orientated programming they will be taught C#, Java and then certain frameworks that go along with them languages such as entity framework, asp.net and various other libraries. These courses tend to be around 7-8 hours a day with a 1–2-hour self-taught section 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 a web designer will possess such as UX, UI, photo editing, illustration, wireframing, prototyping, video editing or motion graphics.

**Conclusion**

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**References**

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