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Interactive and Educational Web Experience on Substance Abuse

# Acknowledgments

# Abstract

**An overview of the project, is it relevant to what someone is looking for? Think back to when I was researching for the project.**

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# Introduction

I started this project with a vision of a fluid, interactive and educational web experience that details and explores different areas of substance abuse in this country. I wanted it to be easily updateable via a back-end system as statistics on this topic can, and do, change often and significantly.  
I felt that there was a gap in the “market” for a website like this. Looking online for advice, statistics or more general information will more than likely lead you to a government or organisation’s website. These have a cold ambience and wording more akin to a scientific report than a conversation about substance abuse.

The main goal of this project therefore was to fill this gap and provide people with a website where they can find the most up to date information and advice in a warm and aesthetically pleasing environment. I wanted my targeted demographic, 18 to 24-year olds, to have the option of a website that is not solely focused on just the statistics of substance abuse or poses as a source of advice that just provides links that help you find a local GP or centre.

Another important goal of the project that I would not consider secondary to the above is the ability for it to be updated quickly and easily by anybody with the administrator credentials. Information on this topic changes quickly and sometimes significantly, so it is important that the website be kept up to date and the task of doing so be simple and quick. It may not be the case that the person updating the website has any experience in front or back-end web development at all, so making it as simple as possible for them to alter the information on the website is hugely important.

Smaller goals of the project include learning a number of techniques that are completely new to me as a developer and Computer Science student. Before I started this project, I had never developed in PHP or JavaScript and had never used MySQL Databases and PHPMyAdmin.   
Learning these languages and techniques in order to fulfil the rest of my goals was essential and would allow me to broaden my skills in a few different areas of software development.

The outcome of this project that has impacted me personally the most was discovering the number of possible problems that can arise when trying to design and implement a website with this kind of functionality.   
I went into this project with a fair amount of experience in HTML and CSS, mitigating the simpler aspects of the development of the website.   
Learning PHP while developing in it did prove to slow the production of the website down at times and ultimately did not allow me to implement the full functionality I was hoping to achieve in the time I was given. The same thing could be said for JavaScript, however it was used far less in my project than PHP.

My final product is something I’m proud considering the above but I would consider it to be the alpha version of the website and I would definitely look into carrying on with the development of it to achieve the complete functionality that I had initially hoped to.  
I believe that the product is a good representation of the techniques I have learnt throughout this project and a great base for me to improve upon in future updates. It completes my main goal of providing a source of correct and relevant information and advice to my targeted demographic delivered in a manner that is not seen in other common sources.

# Methodology

## Project Management

### Agile

In my interim planning and investigation report, I explained that I chose to approach this project using an agile project management methodology as well as outlined some of the reasons why I chose to use it. Below, I will discuss this approach and explain my reasons further and discuss the effects that it had on my project as a whole.

Agile project management is an iterative approach to delivering a project, life cycles are composed of the release of several iterations or sprints which work towards the completion of the project (Association for Project Management, 2020). This approach allowed me to develop, test and, if needed, adjust each sprint release.  
In my interim planning and investigation report, I mentioned that most of the sprint releases will represent some functionality on the website and this turned out to be true. One thing that did change after I wrote the report were the sprints themselves, there were a lot of sprints that were needed that I did not initially foresee as well as issues that arose during these sprints. To cover this, I provided an updated schedule of activities in my appendix.

Using this approach undoubtably helped me deal with all the issues that I encountered throughout the development of this project. Having the ability to prioritise certain tasks over others and leave issues to be fixed in the future while another task is completed helped to keep my motivation and productivity up.

I tried to make sure that my development was test-driven, by which I mean that I would test every component and feature during and after its development to validate its functionality. Doing this before moving onto the development of another component helped to minimise arising issues 0and, even if they did, they were often much less significant than they could have been due to this test-driven approach.  
I also tried to make sure that I was developing in small sprints. This decreased the size of each individual component I would be developing and, therefore, decreased the time that I would have to spend testing each component. Sometimes this was not an option available to me, for example writing the SQL queries that would enter the questions and answers for the quizzes is a time-consuming task. Luckily, it is easily tested by running some simple GET SQL queries.

### Alternatives

There are many popular project management methods, each with their advantages and disadvantages and each suited more to different, specific project needs.   
For instance, the Six Sigma methodology aims to improve quality by reducing the number of errors in a certain process by identifying what is not working and removing it. It uses quality management methods which are mostly empirical and statistical (Zenkit, 2018).  
This methodology is much more suited to projects conducted by large companies and organisations that want to improve the quality and efficiency of their processes in a data-driven way. Therefore, it was not a methodology I considered for this project.

An alternative I did consider, however, is the Waterfall methodology, one of the more traditional methodologies. It is a linear, sequential design approach where progress flows downwards, in one direction. If I were to employ this methodology, I would only be able to move onto the next phase of development once the current phase had been completed, and only in the specific order below:

* System and software requirements
* Analysis
* Design
* Coding
* Testing
* Operations

There is little flexibility in this methodology. I could not, for instance, change my decision on the design of the website after undergoing testing. It also limits the amount of possible customer feedback available to the developer during the development process. In my case, this would not be so much of an issue as I am a solo developer and there is no one specific customer for this project. The lack of flexibility, however, was the key factor that turned me away from this methodology.   
Waterfall is better suited to larger projects that require maintaining stringent stages and deadlines or projects that have been conducted many times where chances of problems arising during development are low.

## Primary Research

I did not require a lot of primary research to be undertaken for my project as all the content that would be featured on the website would be the result of my secondary research. I did however think that it was important to conduct primary research to assist me in the user interface decision on the website.   
I decided to create a simple questionnaire for this and send it out to my fellow Year Three Computer Science students via email, there a number of advantages to a questionnaire which I have outlined below:

* They are quick and free to send out
* Large populations can be targeted easily
* Respondents can reply easily

There are, however, also several disadvantages that come with email questionnaires:

* They may be filtered as spam and easily deleted
* If the questionnaire is sent as an attachment, it may not be readable or take too long to download
* If the questionnaire is embedded in the email, it may not appear clearly as formats change from one system to another
* It can be difficult for respondents to reply anonymously, which may put them off

(Dawson, 2015)

These advantages were the main reason I chose to send the questionnaire out via email, it was quick and straightforward for me to do so allowing me to focus more time on other parts of the project but I could also easily send it to every Computer Science student.  
I did encounter some of these disadvantages however. I was worried that I would not get a lot of respondents as I understood that everyone was busy with their own projects. I was hoping that, as we were all in the same position, a good number of people would reply with their answers, however. I was also worried that many people would not reply with their answers as it could not possibly be anonymous due to them having to use their university email. The obvious way to fix this problem would be to use something like SurveyMonkey so that all the answers could be anonymous. However, as SurveyMonkey is not GDPR compliant, I could not use it.

These worries came to fruition in the end as I only received two questionnaires back from my email. This, of course, is not enough for me to draw any conclusions from. As the questionnaire was only asking for UI input and did not require any Computer Science knowledge, I decided to ask some family members for their answers.   
My results from the questionnaire, as well as the questionnaire itself, are shown in the appendix.

Another form of primary research that I conducted was through the use of Stack Overflow. I was able to use Stack Overflow whenever I faced challenges throughout the implementation. This allowed to receive information, or answers, that are specific to my problem and context. The ability to receive the help and feedback from people who are much more experienced than I am in the area that my question refers to (PHP, MySQL, JavaScript, etc.) was invaluable.

One example is when I was facing a problem implementing my quizzes within modals. I wanted to use JavaScript store the user’s score in a variable so that it could be checked at the end of the quiz. Although I did not end up implementing this functionality, I gained valuable insight into methods that I could use to try and fix my problem. For instance, I was not aware that there was a console that you could log to using JavaScript and one answer showed me this (Olsen, 2020). In my references, I have included any other questions that I posted to Stack Overflow.

This is a much less quantitative method of research when compared to the statistics I gathered from the reports and studies mentioned earlier, but it was an essential part of the development of my website.

## Secondary Research

**If I used in the project put in here, if only used to gain insight bibliography, indirect/direct quotes**

### Secondary Research For Website Content

Secondary research was an essential part of this project, information that I retrieved using it makes up the majority of the content on my website. Therefore, it was important that the information I found using any secondary research methods was accurate and valid. This is especially important given the nature of the content.

I used the internet to collect this information for a number of reasons. I have outlined the most significant below:

* Information is quickly and readily available
* It is free
* Information from government agencies is widely available

Of course, these advantages need to be taken with a grain of salt. Anyone can post some information on the internet true or not. Therefore, as I mentioned earlier, the information had to be accurate, valid, and reliable. To minimise the likelihood of finding information that is none of these three criteria, I only looked for reports, studies and statistics from government and professional agencies. These include:

* Public Health England (PHE)
* The NHS
* The British Medical Association (BMA) board of science
* Home Office

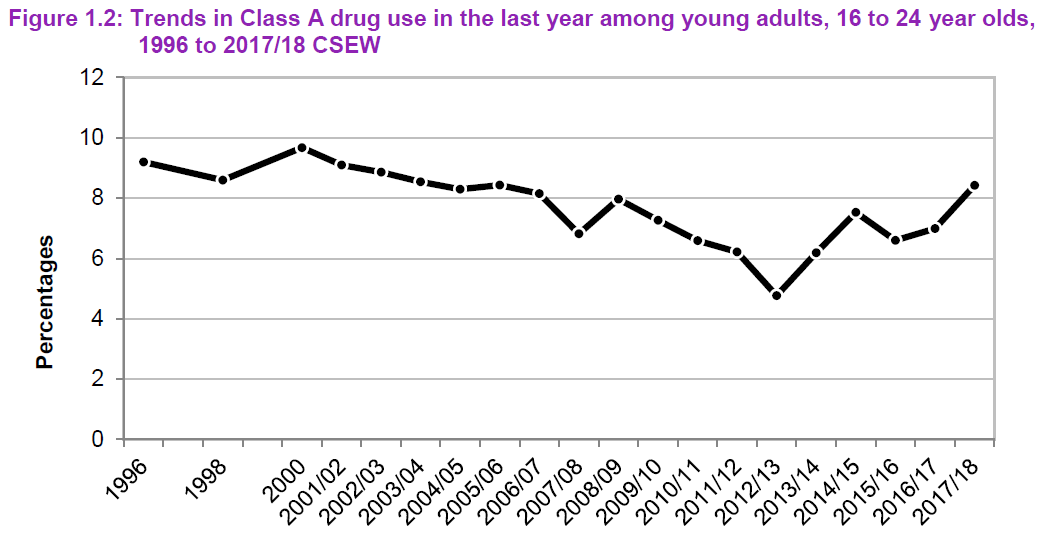
I was able to gather valuable quantitative results from these agencies that provided a lot of insight into the topic for myself and content for the website. I have included an example of a visualisation of the information I gathered, provided by the Home Office, below.

Figure - Trends in Class A drug use in the last year among young adults, 16 to 24 year olds, 1996 to 2017/18 (Home Office, 2018)

There are a few disadvantages to the approach I took, however. By limiting my scope to only government and professional agencies, I am disregarding a lot of information from other sources that could help me in the development of my website.   
This is something that I had to accept as the importance of accurate, valid, and reliable is huge when talking about creating a website regarding something as sensitive and important as substance abuse.

### Secondary Research During Implementation

Throughout the implementation of the website, I had to conduct more secondary research to gather information needed regarding the coding languages I used, especially PHP. I used a few different techniques to gather this information but, once again, the main technique was using the internet.

I mentioned in the Primary Research section that I had asked questions on Stack Overflow, I also used Stack Overflow to search for answers to problems I was having without asking a question myself. More often than not, I found a large amount of content on the website regarding problems I was having throughout the development in the form of previously asked questions and their corresponding answers.   
One example of this is when I was trying to work out how to navigate from one modal to the other using a button. I understood that I had to close the current and open the next but being new to JavaScript and modals, I was not sure how to approach the problem. Fortunately, I found a question regarding the problem and one of its answers helped me fix the problem perfectly (Luurtsema, 2013).

Another method I used, albeit less frequently, was video tutorials. There is a vast array of video content available online concerning PHP, JavaScript, web design and every other aspect of this project. This research method is as valid as looking through Stack Overflow for answers to my questions, and the reason that I used it much less is simply a personal preference. I feel that I understand and take in content more effectively when I am reading it rather than watching or listening.  
The most significant use of this method throughout my project was when I was implementing my quiz functionality. I found a two-part tutorial (WebTutsHD, 2010) that covered creating a PHP Quiz application and after following it I had the exact functionality that I was looking for in my quiz at the time.

## Development Tools

I used a number of tools throughout the development of this project, ranging from the IDEs I used to the software I used to draft the design of the website. However, there are some main tools that I used and would like to discuss and reflect upon. These are:

* The Integrated development environments (IDE) that I used
* cPanel
* phpMyAdmin
* MySQL databases

### IDEs

In my interim planning and investigation report, I wrote that I had decided on using Adobe Dreamweaver as my IDE for the development of my website. I initially decided on Dreamweaver because of its functionality for HTML, CSS, PHP, and JavaScript as well as its live preview feature that I believed would speed up the development process and improve the quality of the website. I quickly came to realise that the live preview feature did not work for PHP pages if you do not have a live server connection and without one, I could not use it at all. To test my code, I had to reupload the PHP file to my File Manager in cPanel and reload the page every time. Despite this, I carried on using Dreamweaver for another two months.

During this time of development, I was using Visual Studio Code for another project at university and much preferred developing in that environment. It felt quicker, more intuitive and a lot more modern. After some research, I found an extension called PHP IntelliSense (Becker, 2019) that handles auto-completion refactoring support for PHP in VS Code. It was extremely simple to move all of my code over to that IDE, which was the only thing that I was worried about, so I made the change from Dreamweaver to VS Code.  
I’m very glad that I made the change as I believe that developing in an IDE that you are comfortable in and having confidence in its ability and feature-set is a hugely important aspect of development. I think that if I decided to stay with Dreamweaver, the time it would have taken me to develop the same website would have been a lot longer.

### cPanel

cPanel is a web hosting control panel that provides users with a GUI and automation tools designed to simplify the process of hosting a website. It has a huge library of features that range from tools for databases to Git version control. I was only interested in three of these features; phpMyAdmin, MySQL Databases and the File Manager. These three tools combined had all the functionality that I would need in order to create my website.

Accessing cPanel is extremely easy as a Brighton University student as it is just a case of logging into Brighton Domains and, in my case, creating a domain. I then place all the files required for my website (HTML, PHP, JavaScript files, images, etc.) into the “public\_html” folder in the File Manager and then the website is live.   
I could then implement any database functionality that I needed for the website by creating a new database in MySQL Databases as well as a new user (in this case, myself) and giving them complete privileges. All the database design and implementation, such as running SQL queries to create tables, can then be done through phpMyAdmin.

Having all these tools so easily accessible and all in one simple and intuitive graphical user interface really helped me in efficiently developing my website. Below, I will briefly talk about phpMyAdmin and MySQL Databases.

### phpMyAdmin

phpMyAdmin is a free, open source administration tool for MySQL. It has a lot of great features for MySQL administration, including but not limited to:

* Web interface
* Import data from CSV and SQL
* Export data to a number of formats, for instance XML, PDF, Word, Excel and more
* Creating complex queries using query-by-example (QBE)
* Searching globally in a database or a subset of it

(Wikipedia, 2020)

This feature-set easily makes phpMyAdmin as one of the best tools to design, create and modify MySQL databases and made it perfect for my use case. I did not have much experience in database design and implementation before this project, so in order to maximise efficiency and minimise potential problems during development using phpMyAdmin made perfect sense due to its accessibility and simplicity.

There are a number of alternatives I could have used in place of phpMyAdmin. These include Adminer (formerly phpMinAdmin), a full-featured database management tool also written in PHP. It consists of a single file ready to deploy to any target server and is one of the most popular alternatives to phpMyAdmin. Its user interface is a lot more simple than phpMyAdmin’s which, it could be argued, makes it easier to use (Adminer, 2020).   
However, once you are used to the phpMyAdmin user interface it is extremely simple to use and I never experienced any problems with it. The integration with cPanel made this an obvious choice for me and I never looked elsewhere.

### MySQL Databases

The MySQL databases cPanel tool is incredibly simple and functional. MySQL databases are necessary to run many web-apps on the internet such as content management systems or online shopping carts. They also help to run smaller features in websites, such as the quizzes in my own.

Creating a new database is as simple as choosing a name for it and clicking the “Create Database” button. In order to use the created database, a MySQL user is needed. Creating this is simple too, all that is needed is a username and password. After all this is done, you select the user and add them into the database and the database is ready to be used.

Once again, there are many alternatives to MySQL. MariaDB is probably the most popular alternative, it is a database server with drop-in replacement for MySQL created by the original developers of MySQL. It has a lot more storage options available and is faster than MySQL.  
These advantages are not significant enough for me to have considered MariaDB as an alternative, however. My storage needs are extremely small due to the simplicity of my database and because of the small number of queries that I am running speed is not really a factor. On top of this, the integration with cPanel is invaluable once again so I did not consider any alternatives to the MySQL database tool.

## Testing

### Methodology

Due to the way in which I developed my website and the fact that I was learning new techniques and content during the development, I used the unit testing approach to test my website. Unit testing is an approach to software testing where individual units, or components, of a software are tested. The purpose of this approach is to validate that each unit of the software performs as designed and intended. A unit is the smallest testable part of any software. This could be an individual program, function, procedure, etc. In object-oriented programming, the smallest unit is a method and this may belong to a base/super class, abstract class or derived/child class (Software Testing Fundamentals, 2020).

This suited the development of my website well because I was mostly learning one technique or functionality before moving on to the next. Testing that functionality before moving to the next felt natural from the beginning of development.   
A good example of how this style of testing was effective was during the initial development of my quizzes. As this was brand new knowledge to me, there was a big risk factor and possibility that I would not get it completely right the first time so testing it immediately and thoroughly was essential.

Unit testing increased my confidence in changing and maintaining the code I had. If I had created good unit tests and if I ran them every time I changed code, I would be able to quickly catch any problems occurring because of those changes to the code.   
This approach to testing also promotes more modular coding which helps tremendously in unit testing as well-designed modular code can drastically lower the number of possible causes of a problem.

### Test Plan

There are many tools and frameworks available for unit test almost any language. This kind of automated testing can significantly improve the workflow of development by allowing pre-written tests to drive the development process.   
Despite these tools and frameworks being available to me, I decided to create my own simple test plan and stick to that throughout the development of the project. Because I was developing in several languages, I decided to design the plan to be quite general so that it could be applied to any of the languages I was using.

# Product Description

## Introduction

## Requirements Analysis

## Design

how did research influence design, 3 tier architecture, database design

## Implementation

## Evaluation

(of choices and outcomes)

# Critical Review

## What has been successful?

## What could I improve upon?

## What I learnt and the future

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**IN HERE, I NEED TO PUT ANY SOURCES THAT I DID NOT DIRECTLY USE FOR THE PROJECT, BUT HELPED ME GAIN INSIGHT INTO A PROBLEM AREA, TOPIC, ETC.**

# Appendices

**Appendix 1:** Record of meetings with supervisor, to demonstrate engagement with the project process  
**Further appendices:** These will depend on your project and should be agreed with your supervisor but could include the results of testing, surveys or design documents