

Software Project

**Your name**

**Adam Gallagher**

**Your student number**

**N00211418**

Software Project

Online shop for bidding on second hand guitars

Year 2 2022-23

DL836 BSc (Hons) in Creative Computing

Link to resources created as part of the project.

|  |  |
| --- | --- |
| GitHub | https://github.com/y2-SW-project/swproject23-AdamGallagher27 |
| Video | Link to your video file (MS Stream, YouTube) |

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# Introduction

Overall aim

Application area

Technologies

PHP, MySQL, Bootstrap, CSS, Vanilla

Tools

IDE, phpMyAdmin, Miro

Project management

GitHub

Business Concept

Requirements

Design

Implementation

Testing

Reflection

# Business Concept

## Business Idea

The business idea is an online shop that allows users to sell their guitars or start bids for them. This will give an alternative and sustainable option for buying guitars instead of relying on buying guitars new from larger companies like Epiphone or fender.

## Business model

The business model is loosely based off how Depop works. Depop allows users to sell their clothes online and they take a commission off every transaction. The website would work in the same way.

## Market Research

The musical instrument business was worth USD 14.20 billion in 2022 and is expected to grow 7.4% from 2023 to 2030. There is a gap in the market for users to find and sell sustainably sourced guitars.

The most obvious demographic for guitars is musicians but there is also a market for music shops that don’t have their own online store. These two demographics make up the majority of the users for this platform. It also goes without saying not all customers are musicians or shop owners, some may just be people buying an instrument as a gift.

## Marketing/Advertising

Market research would be conducted to see how to connect with musicians online. Another strategy that was considered is getting a music influencer or Youtuber to endorse the product.

## Suppliers

There is no need for suppliers for this business as the users are their own suppliers as they are the ones selling and buying their own guitars.

## Competitors

The major competitors in this space are the traditional instrument distributors like fender or Epiphone. They have a major market share but most of them don’t have an option to purchase second-hand guitars, their goal is to sell their new products.

## Employees

As mentioned in the supplier’s section the customers would handle supplying their own guitars.

## Environmental Impact

While guitars are not the worst contributor to climate change, they are far from perfect. Some of the most endangered tree species are used for creating guitars for example Honduran rose wood or Pau Brazil. This store hopes to reduce the environmental impact.

From manufacturing new guitars.

# Requirements

## Introduction

This portion of the report is dedicated to the research that was conducted for the website.

This was used a precursor to the design phase. Use case diagrams where made and competitor analysis was done. In addition to these two interviews where conducted with two musicians.

## Requirements gathering

For the requirement gathering competitor analysis on fender and gear for music.

I also did two interviews with two musicians. They were the ones who recommended at fender and gear for music for the competitor analysis.

### Similar applications

The first competitor that was looked at was a more traditional guitar shop. Fender is the world’s largest seller of guitars. The main advantage of buying from Fender is you can trust the quality of their instruments are superb and you can guarantee what they advertise is accurate to the product. A major negative feature of fender is the products are sustainably sourced and there is no option to sell or buy second hand instruments.

A group of guitars

Description automatically generated with medium confidence

Figure : fender shop page

Their website design is very sleek and minimalistic. It is very easy to navigate and understand every detail about the product you are buying see figure 1.

A picture containing diagram

Description automatically generated

Figure : single product page fender

You can see again in figure 2 fenders minimalistic design. Figure two also highlights two of the issues with Fender. You can also see that the finger board is made from ebony wood which is an endangered wood. Despite the environmental impact and the lack of a second hand shop feature the fender website is very well designed website that is intuitive and aesthetic.

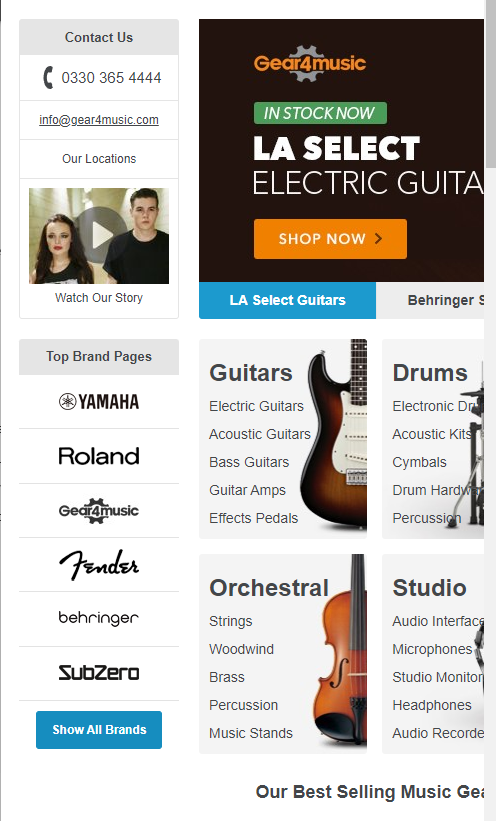


Figure nonresponsive web design

The second competitor that was analysed was gear for music. Gear for music is one of the biggest online vendors of instruments in Europe. They have a huge variety of stock, and their website is very easy to use. Despite the websites size and practical functionality, the website is not designed very well and feels very clustered at parts see figure 4. The major drawback with gear for music is that their website is not responsive. When scaled down to a mobile size the components were overlapping and made it hard to navigate see figure 3.

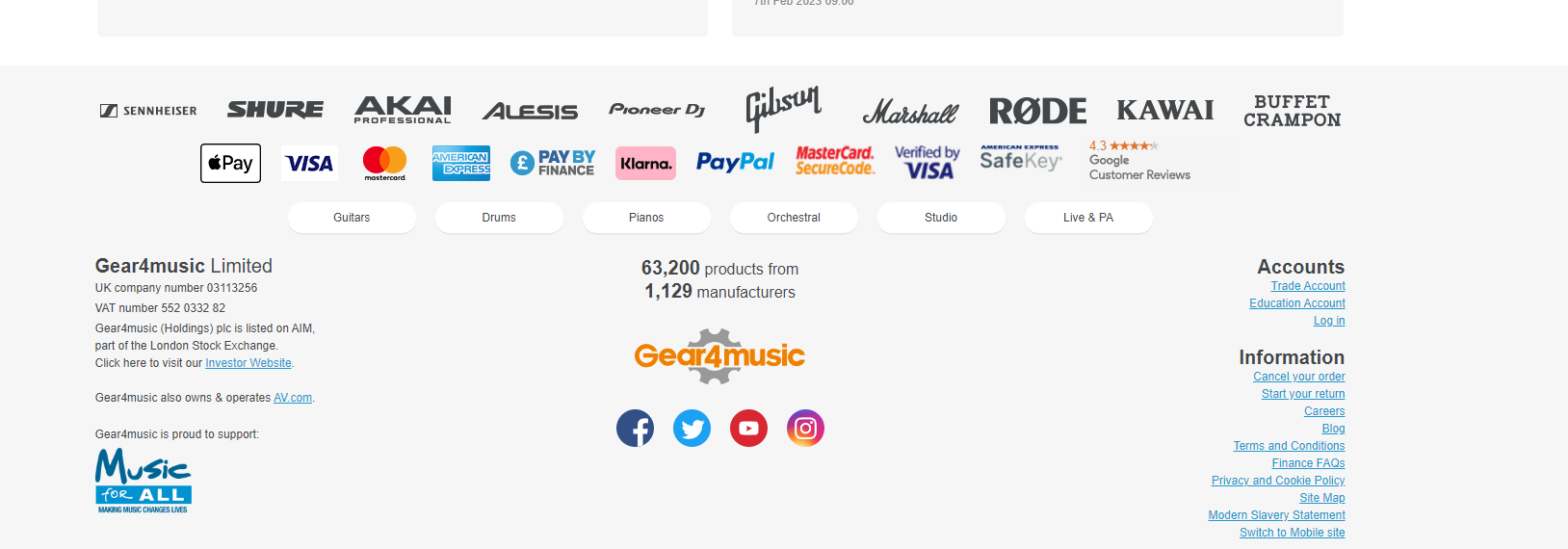


Figure over cluttered footer

The best part of this design was in the product page. While the aesthetic was not perfect it was very functional and easy to make a purchase and see the specifications of each product see figure 5.

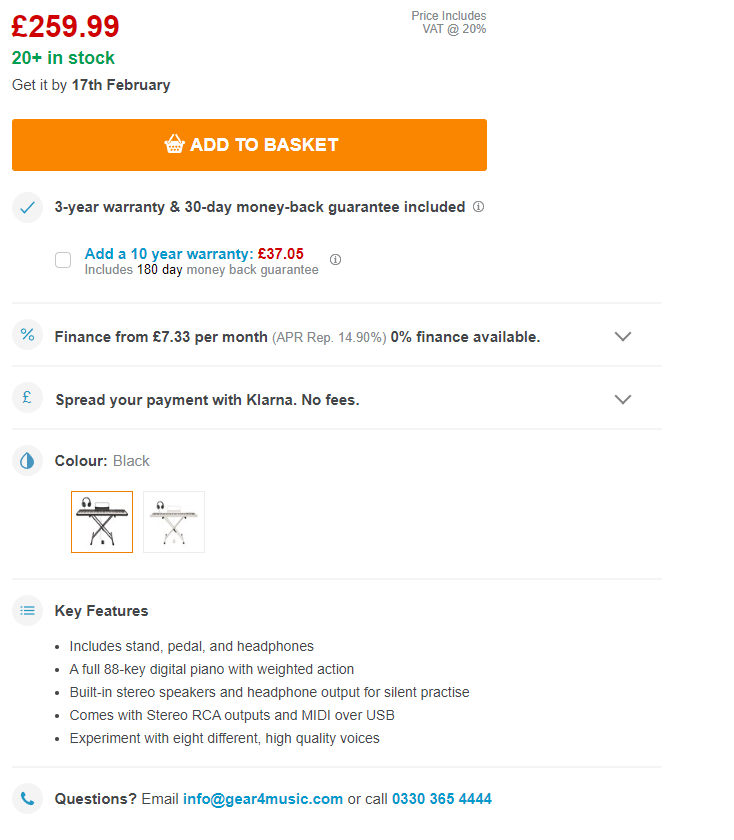


Figure gear for music product purchase

The main problem with the aesthetic is the colour palette. The red of the price doesn’t pop enough and the green that symbolises the amount left in stock clashes with the other colours on the page.

### Interviews

Graphical user interface, text, application, email

Description automatically generated

Figure : interview questions

Interviews with two musicians where conducted. They were asked five questions for the interviews see figure three.

Question 1:

For the first questions the first user said they buy their instruments in their local music shop when the other users cited the fender website or gear for music for all their instruments.

Question 2:

The first user said they prefer buying in shop because they can test the instrument before buying it. The second user likes the convenience of shopping online and there generally very quick at delivering whatever she ordered.

Question 3:

Both users had the same answer that they wouldn’t mind bidding, but they would still like an option to buy the product outright. The first user reiterated that knowing the quality or sound of the instrument would help them make a purchase.

Question 4:

The first user said they want it to be easy to use and give many options for different types of instruments. The second user likes when the website gives detailed explanations of the specifications of each instrument.

Question 5:

Both users had the same answer again. They both disliked that you are never certain as to what you are buying, and quality may vary from different online vendors.

## Requirements modelling

### Functional requirements

1. Users can buy guitars.
2. Set up a shop and sell guitars.
3. Make bids or buy outright.
4. Admin uses can do crud on all post’s comments.
5. Comment on posts.
6. Wishlist / favourite guitars.

### Non-functional requirements

The three primary non-functional issues are Usability, Performance and Security.

I want my website to be as user friendly as possible I plan to do user tester to try remedy any issues in this section. I will eager load all my data and optimize my code to improve performance. Security is a very important issue when it comes to ecommerce websites. I would use a trusted API for handling purchases like snip cart.

### Use Case Diagrams

Diagram, engineering drawing

Description automatically generated

Figure use case diagram

See figure seven for the use case diagram. This was used to map how users will interact with the website. Three roles where defined NormalUser, ShopUser and Admin.

## Feasibility

Laravel 8.1

Livewire 2.6

Tailwind 3.2.7

Php 8.1

JavaScript ES13

PhpMyAdmin 4.9

# Web application Design

## Layout

For my layout I will be using tailwind and livewire to have my design be responsive and have some of my components be reactive for example the like button and the bids on each post. I aim to have a minimalistic design that is heavily inspired by the depop and fender websites.

See figma file [here](https://www.figma.com/file/J2qKXjUh1eIxAHhf3QvflH/SoftwareProject?node-id=0%3A1&t=1xfspNLJbvhvOlpR-1).

## Interaction

The main feature of my website will be the ability to make posts (putting on instruments for sale) and the ability to make bids on them. For the user to make a post they would have to fill out a form which would gather information about the guitar they are selling. Examples of data would be the make, the condition, the colour. I want the bidding to be reactive. The product will list what the top bid is currently, and the user can raise that by putting in their own bid. This will update the database / current highest bid without a page refresh using livewire.

## Colour schemes

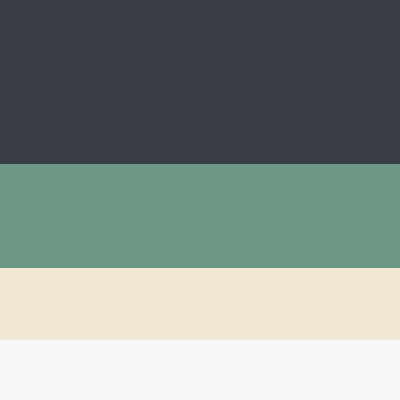


Figure main colour palette

Before the design process was started several possible colour pallets where chosen. Example of this is seen in figure 8.



Figure possible colour palette

The main palette (figure 7) was chosen as it is minimalistic, and the green primary colour is representative of the website’s sustainable values.

## Font choices

Text, logo

Description automatically generated with medium confidence

Figure main font pairing

The font Karla was chosen for the titles and Spectral was chosen for the regular body text.

These were chosen as they are like fonts chosen on the fender website while still being unique to this website.

Graphical user interface, text, application

Description automatically generated

Figure font palette

After the font styles where selected a font palette was created. The design of the webpage is very minimalistic, and this is reinforced through the simple font palette.

## Wireframes



Figure nav bar

Every page will have this nav bar implemented. This is essential to navigating the website. The capo text at the top left will take the user to the home page. Under that are different types of guitars. Clicking on these will take you to the search page (see figure 13) showing results with the selected guitar type.

Diagram

Description automatically generated

Figure homepage

Figure 12 will display the top trending shops and products. At the bottom of the page there is an article section where it explains the process of selling and shopping on this website.

Calendar

Description automatically generated

Figure search page

Figure 13 is the search page. When a user makes a search the result of their query will be shown here. Above all the products there are options to filter the search by type, condition or price.

Diagram

Description automatically generated

Figure profile page

Figure 14 displays the current users posts and their liked posts.

Graphical user interface

Description automatically generated with low confidence

Figure product page

Figure 15 is the individual product page. From here users can make bids and purchase guitars. They can also favourite the guitar from this page.

Diagram

Description automatically generated

Figure user flow diagram

See figure 16 for a basic user flow diagram. This was used to understand the flow of the website and keep track of what features are to be developed for the website. Red signifies a page where yellow signifies an action. The log in / sign up is marked in blue as to not be mixed up with the other elements in the diagram.

# Database Design

## Description

This businesses database tracks many important details about the products and the users.

The database will store data about each guitar and its condition. For each product the name, type, price, bid-expiration date and the condition will be recorded. It will also track the bids made by each user and also show who has won the bid when the bidding time expires.

Table for the three user roles (user, admin and shop) will also be created. Users favourited posts will be saved as well.

## Business Reporting Requirements

1. admin user need to do all crud operations on every product

2. shop users will be able to do crud operations on products they are selling

3. regular users wont be able to do any crud operations but will be able to make bids on guitars.

4. regular users and shop users can favourite any post.

5. users will be able to search for products and filter their results.

## Textual Representation of Dataset

User (id, user\_name, real\_name, role\_id, email, password)

Guitar (name, description, make, type\_id, price, condition\_id, bid\_expiration, user\_id)

Type (id, name)

Condition (id, state)

Role (id, role\_name)

User\_Bid (user\_id, guitar\_id, bid\_amount)

User\_Like (user\_id, guitar\_id)

## Business Rules

One user has one role.

Many users can favourite one guitar.

Many users can bid on one guitar.

One condition can have many guitars.

One type can have many guitars.

## Entity Relationship Diagram

An entity relationship diagram (E.R.D) was designed. These are used to visually map the relationships of all the tables in the businesses database.

Diagram

Description automatically generated

Figure E.R.D diagram

## Tables

The E.R.D see figure 17 is expanded upon and the tables are added in with all their elements.

**Chart, box and whisker chart

Description automatically generated**

Figure database tables

## Database Dictionary

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Table | Attribute | Datatype | Range | Required | PK/FK | FK Ref Table |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

# System Design/ Architecture Overview

* 1. Introduction

The website uses Laravel as its main back end. Laravel is written in php and uses the Model, View, Controller (MVC) Design Pattern. For the front-end blade templates will be used for static components and live wire for reactive components. The components will be styled with tailwind CSS. Factories and seeders will be used during development to populate the database, Laravel has the functionality for this built in. Laravel breeze will be used to handle the user authentication.

* 1. Model View Controller

The model view controller has three components. The Model handles all the database logic. The view is the UI that is rendered to the screen. The controller is the brain of the app that controls how the model and view work together. Each table in the data base is represented by a migration and each table has a corresponding model. The model is used when adding data to the database in the seeders. It is also used to create the relationships between each table. Each page is a blade file and is stored in the views file. These are served to the user and they see it in the browser when they go to the website. The controller handles all the logic for the website. Creating, updating and deleting is handled here. The bidding logic will have its own controller to handle the bids.

* 1. User Authentication

Laravel breeze is used for the user authentication. Breeze is an extension made by the creators of Laravel that implements the authentication features of Laravel in an easy to use package. The Authentication source code will be edited to add user roles and, in the sign up form.

* 1. Routing

Each user and view will have its own routes. So, there will be the admin index route and the user index route. There will also be a special route to handle assigning user roles on signing up. This route will then redirect them to the correct route depending on their role.

* 1. Templating

Describe the templating engine and how it was used to configure/ style the web application.

Blade templates where used for the static components but the reactive components will be made using live wire. Each component will be styled with Tailwind CSS.

Add a sequence diagram in this section and other diagrams that illustrate the architecture clearly.

Diagram

Description automatically generated

# Testing

* 1. Introduction

This chapter describes the testing that has been undertaken for the application. This chapter is presented in two sections:

1. Functional Testing
2. User Testing

Functional testing is a type of software testing whereby the system is tested against the functional requirements. The app is tested by looking to see if the actual output for a given input corresponds with the expected output. The tests should be based on the requirements for the app. The results of functional testing can indicate if a piece of software is functional and working, but not if the software is easy to use.

User testing looks to see if a piece of software is easy and intuitive for the user.

* 1. Functional Testing

This section describes the functional tests which were carried out on the app. These functional tests can be categorised as: (whatever is relevant to your app)

* Login/Registration
* Navigation
* Calculation
* CRUD

Functional testing generally uses a Black Box Testing technique which means that the internal logic of the system being tested is not of interest to the tester. The tester is only interested in whether the actual output agrees with the expected output.

* + 1. Login/Registration

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test No | Description of test case | Input | Expected Output | Actual Output | Comment |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

* + 1. Navigation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test No | Description of test case | Input | Expected Output | Actual Output | Comment |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

* + 1. Calculation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test No | Description of test case | Input | Expected Output | Actual Output | Comment |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

* + 1. CRUD

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test No | Description of test case | Input | Expected Output | Actual Output | Comment |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

### Discussion of Functional Testing Results

Describe the results from the tests. Address any functionality where unexpected behavior could not be debugged.

* 1. User Testing
  2. Conclusion

Discussion of test results.

# Project Management

## Introduction

This chapter describes how the project was managed. It shows the phases of the project, going from the project idea through the requirements gathering, the specification for the project, the design, implementation and testing phases for the project. It also discusses GitHub as a tool which assists in project management.

## Project Phases

In this section, describe each of the following project phases. Explain any issues which arose for each of the phases.

### Requirements

### Design

### Implementation

### Testing

Include a Gantt chart



## SCRUM Methodology (optional)

Sprints

## Project Management Tools

### GitHub Project

Description

Include screen shots

How it worked in practice

### GitHub

Description

How it is used

How it worked in practice

# Reflection

## Your views on the project

Describe how you feel the project went from your perspective.

## How could the project be developed further?

## Assessment of your learning.

Critically assess your learning. List what skills and competencies you have learned developed in this Continuous Assessment.

List which part of the project would need further development and itemize where you feel you have not satisfactorily completed the continuous assessment.

## Completing a large software development project

Describe what you have learnt from the project, from the point of view of completing a large software development project.

## Technical skills

Describe what you have learnt from the project, from a technical skills viewpoint.

## Further competencies and skills

Describe any extra competencies and skills that would help you with your development in the workplace.

# References

Add a list of references that you used to complete the project.

The Department of Technology and Psychology in IADT uses APA 7th referencing style.

Use alphabetical order for your references.

This site gives details about how to cite websites using APA:

https://www.wikihow.com/Cite-a-Website-in-APA

The following is a useful site for creating citations for APA for websites.

<http://www.citationmachine.net/apa/cite-a-website>

You can also use the Referencing tab within Microsoft Word to enter reference information manually. Word then creates an APA style reference.