DEVELOPING MULTIMEDIA ACTIONS FOR THE CATALONIA RAILWAY MUSEUM

An EPS/IDPS Project of the EPSEVG, UPC BarcelonaTech, in collaboration with the Museu del Ferrocarril de Catalunya

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11/06/2015
TITLE: Developing multimedia actions for the Catalonia railway museum

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DATE: 11.06.2015
Developing multimedia actions for the Catalonia railway museum

11 Juni 2015

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Supported by the EPSEVG, UPC BarcelonaTech, and the Museu del Ferrocarril de Catalunya
Abstract

The Catalonia railway museum, located in Vilanova i la Geltrú, participated in the European Project Semester for the second time in 2015.

The aim of this project was to develop a new, additionally website for the museum with the purpose to improve the visibility, the offered service and the advertising of the museum. Besides the special information about the railway history and the conservation of railway heritage the website includes relevant information about the museum. The main language of the website is English.

To receive an overview of the current market, some research about existing associations for industrial heritage and railways was done. A comparison of the different marketing strategies was done and the best was selected. The previous work included a definition of the target groups, their requirements and how to consider them.

The website was developed by using WordPress. The content was collected and several plugins were selected to visual the content as good as possible. By using a questionnaire the website was tested regarding the usability, satisfaction and effectiveness. Considering the results of the test the website was reworked.

To connect the visitor with the new website and to forward him directly to it a QR-Code was created.

Key words: Railway heritage, Railway museum, Website developing, Usability, QR-Code
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1. **General information**

1.1. **The Project**

This report is part of the European Project Semester and Industrial Design Project Semester at the Escola Politècnica Superior d’Enginyeria de Vilanova i la Geltrú (EPSEVG) in 2015. In cooperation with the “Museu del Ferrocarril de Catalunya” the project group has to develop a website which fulfills the objectives explained below. The Project takes place from the sixth of February to the 19th of June.

![Picture 1: The team](image1.jpg)

This picture portrays the project group. In the front row from left to right it can be seen Weronika Walczak from Poland, Annika Zloch from Germany, Clarisse Broyon from France and Ana Grande Jiménez, the supervisor of the museum.

In the back row it can be seen on the left side the supervisor of the UPC Pere Ponsa Asensio and on the right side Bernhard Schopper from Austria.

1.2. **Museu del Ferrocarril de Catalunya**

The Catalonia Railway Museum, which is located in Vilanova i la Geltrú, is the biggest Railway museum in Catalonia. The original idea to open a museum was from the Asociació d’Amics del Ferrocarril de Barcelona. In 1972 they collected a wide range of steam locomotives to present them to the different European associations on the occasion of the 19th European Model Railway Congress.

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1 http://www.amicsdeltren.com/
The reason for choosing Vilanova as the location for the museum was that in 1967 the steam locomotive depot was closed. The depot already had a turn table, a water tank and an engine shed for retaining the vehicles. Another reason was the long railway tradition of Vilanova i la Geltrú.

In 1990 the museum opened officially with the collaborative effort of RENFE.

Nowadays, the museum is managed by the Fundación de los Ferrocarriles Españoles and is part of the Catalan Science and Technology Museum System. It has one of the most extensive collections of Railway locomotives in the world.

The ambition of the Museum is “to convey the significance of industrialization for ways of life and work as well as showing the technical advances of the transport revolution”. The Museum “is intended to be a vehicle of communication and contract with present and future generations”.

1.3. Project idea
With regard to these objectives Ana Grande, the head of education and communication, and Pilar Garcia, the director of the museum, had the idea to develop a new and unique website about the industrial railway heritage. It would include both, the history of the railways and the possibility for the various railway museums to communicate.

The website will be additional to the official website to provide special information about the railway heritage because there is no website like this existing until now. The official website is in Spanish, Catalan and English but the English part is not elaborated. To provide information for all people, the new website will be in English and includes all of the most important information about the museum.

1.4. Background
Since the year 2010 the Museum collaborated with the Universitat Politècnica de Catalunya BarcelonaTech, with the aim to develop shared projects in accessibility, interaction and technology. In 2014 the museum took part at the European Project Semester and the International Design Project Semester for the first time.

The purpose of last year’s project was to provide opportunities to improve the visibility of the museum. The goal was to create and implement some suggestions to improve the visitor experience. To reach this goal the group did a thorough study about the current state of the museum. Finally, they developed a prototype of a smartphone application.

1.5. Objectives
In the scope of the project the following objectives were found together with the supervisors.

The main objectives of this year’s group are to design and develop a unique and special website about industrial railway heritage and to include multimedia files such as videos and photos.

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2 http://www.ffe.es/
3 Guide Catalogue Railway Museum, page 16
It is another objective to create a QR Code to open the website directly on the phone. The website also has to include a connection to the official website and the social media networks that are used by the museum to enable visitors to obtain further information.

The aim is to expand the official website with the new website to improve the user experience by providing more information in English because the English part of the official website is quite short and not elaborated. The new website will include additionally an education section which describes the participation of the museum in projects with students and it will include some documents such as the reports from the EPS/IDPS. Another added value of this website is additional information about railway heritage and railway conservation.

A further objective is to create a kind of communication network between museum partners by using a blog to improve relationships.

The most important thing in this project is to develop the basic structure of the website which will enable the museum employees to maintain the website and to substitute and add content by themselves. Regarding this, it is not necessary to include all information existing because the museum will continue this work after the project.

1.6 Report structure
The report is divided into thirteen sections. The first one is the section above giving general information about the project. The second section describes the research work and its conclusions. Afterwards the possibilities of marketing are explained and the useful method for the museum website selected. After this section the existing requirements are listed. The next section explained the website, leading from the general information about the design and the development to the specific steps in the new website. Then the testing methods and the results of the chosen one are mentioned and the according redesign of the website. Moreover an introduction in Google Analytics is performed. Finally, it is explained how QR codes are used and the conclusion and further research of the project are listed.

2. Research
In order to meet the objectives some research about railway history, the industrial heritage associations and some big museum websites was done.

The aim of the research was to obtain an overview about the existing market to open the opportunity developing the most attractive website as possible.

2.1. General history
To give an insight into the topic, some research about the industrial revolution was done.

The industrial revolution started in the early nineteenth century by developing the first steam engine.
Until then people traveled by horse caused that the speed was limited. It was impossible to cover long distances for poorer people because they can’t afford a horse.

Suddenly, through the steam locomotive it was possible to cover long distances in a speed never done before. The steam locomotive enabled poorer people to travel.

This development opened many new markets. The engine steam enabled the industrial revolution.

But in the twentieth century cars and trucks became more popular and a high number of railways lines were decommissioned. Nowadays the steam locomotives were replaced by diesel and electric motor power.

To preserve the railway history and to portray its impact on our cultural and social history, groups in different parts of Europe spend much time and money to restore the old locomotives.

2.2. Industrial Heritage Associations

To figure out the existing associations and the provided information, some research about industrial heritage associations in the world was done. One point was to discover what the special purpose of their association is and if they are a potential communication partner.

2.2.1. FEDECRAIL

The European Federation of Museum and Tourist Railways is a European association. It is consisting of different national associations out of the various countries of Europe. The countries which haven’t got such an association take part with a museum or an individual railway.

The objectives of FEDECRAIL are:

- To promote the rescue, restoration and operation of Europe’s railway heritage
- To represent its members’ interests vis-a-vis international agencies and, in particular, the European Commission in Brussels and the European Parliament in Strasbourg
- To encourage the exchange of ideas across national and cultural boundaries and foster cooperation between museum and tourist railway organizations including museums involved in railway heritage
- To assist provide advice and assistance for such organizations
- To study and resolve problems shared in restoring and operating heritage railways

There are three members in Spain, the ARMF$^4$, AZAFT$^5$ and APPFI$^6$.

2.2.2. The International Committee for the Conservation of the Industrial Heritage

On the website of the International Committee for the Conservation of the Industrial Heritage, short TICCIH, information about current activities, reports, books and other interesting things about railway-locomotives in the world can be found.

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$^4$ The Associació Reconstrucció Material Ferroviari in Lleida was founded in 1996; http://www.armf.net/es/index.php
$^5$ The Asociación Zaragozana de Amigos del Ferrocarril y Tranvías; http://www.azaft.org/
$^6$ Associació per a la Preservació del Patrimoni Ferroviari I Industrial; http://www.appfi.net/
Its goals are to promote international cooperation in preserving, conserving, investigating, documenting, researching, interpreting, and advancing education of the industrial heritage.

2.2.3. **European Model Railway Congress**
The European Rail Congress Summit brings together the European railway industry to discuss and debate important developments within the railways that will determine the future of the European rail sector.

2.2.4. **European Route of Industrial Heritage**
The *European Route of Industrial Heritage*, short ERIH, is a tourism information network of industrial heritage in Europe.

On their website is illustrated the different history of industrialization in various countries. They present more than 1,000 locations in 44 different European countries at the moment.

A key element is to establish a network of Anchor Points. There are 77 Anchor Points at the moment. These points consist of important industrial heritage sites.

They build a regional route to illustrate the different development of the industry and to link the locations. Starting points are the different Anchor Points. The routes lead to smaller industrial heritage sites.

Furthermore there are European Theme Routes existing. These Routes consist of a specific theme of the industrialization.

The website of the ERIH is quite interesting. But there is a great deal of information about the whole industrial heritage. We have focused on the industrial railway heritage.

2.2.5. **Heritage Railway Association**
The Heritage Railway Association represents the majority of heritage and tourist railways, tramways and railway preservation groups within both the U.K and Ireland.

2.2.6. **Ayrshire Railway Preservation Group**
"Bringing Industrial Heritage to Life" – with this slogan presented the Scottish Railway Group themselves. The group was founded in 1947 to preserve the industrial railway heritage from Scotland.

2.2.7. **Steam Heritage**
This website gives a review about Britain's Transport & Industrial Heritage Museums, Railways and Events.

2.3. **Museum Websites**
In order to obtain an overview and examples about several websites we compared some websites of notable, famous museums all over the world.

This comparison is a benchmark study. The compared objective is the website, the competitors consist of famous museum websites and the categories rated are the
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- quality and number of photos and videos, because the new website should include a high number of multimedia tools
- the number of social networks, regarding the expected communication function of the new website
- structure, if it is clear
- balance between attractiveness and seriousness
- interactivities such as a blog or special activities

To compare their websites, it is used a simple rating system. The best rating is triple plus (+++) the worst is minus (-).

<table>
<thead>
<tr>
<th>Name/Location</th>
<th>Photos/Videos</th>
<th>Social Networks</th>
<th>Clarity</th>
<th>Aesthetic</th>
<th>Interactive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rijksmuseum/ Netherland</td>
<td>++</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Museu nacional del prado/ Spain</td>
<td>++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>COOPER HEWITT/ USA</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>Louvre/ France</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
</tr>
</tbody>
</table>

Table 1: Museum comparison

2.3.1. Rijksmuseum
This Museum is one of the best museums in the world. It is placed in the Netherlands. The Website is in Dutch and in English. It is structured in three main pages: “Plan your visit”, “collection” and “about the museum”. In these sections it is possible to choose subsections. They are connected to social media networks and you can log in to leave comments or to build your own “Rijkstudio”. The Rijkstudios are a definitely interesting thing. They open the opportunity to collect a detail from pictures or whole pictures you like. The users have the opportunity to cut the pictures and build something new, for example to design their own handy case. Additionally, it is possible to save pictures during a visit.

2.3.2. Museu Nacional del Prado
The Museu Nacional del Prado has an impressing website but not as appeling as the Rijksmuseum. It’s a clear structured website but it is a little bit insipidly and consist many information. It is in Spanish and in English. They have five sections: “The collection”, “Exhibitions”, “Education”, “Research” and “Pradomedia”. These sections are structured in subsections. The important point “visit the museum” is callable in 14 different languages. They are using a great deal of social media networks. The most special thing on their website is the buying part. They have three opportunities to buy pictures. There is a shop, a printing department and an image bank. Another special thing is that they are offering two applications for their museum.

2.3.3. COOPER HEWITT
Their Website is similar to the Windows8 screen. It’s full of coloured squares and it appears restless. It is not clear because there are many things to click on. Beside the squares there are eleven main sections. They are using social networks and a blog. There are a high number of multimedia actions inside the museum such as tablets and an interactive pen. But the website is deterrent.
2.3.4. Louvre
France’s famous museum has a definitely appealing and clear website. It is in four different languages. It doesn’t take much time to cope in the website. They have a slide-show at the home screen. It is structured in five sections. By clicking on one section the subsection opened in a little screen. Beside the screen is a table with important things such as the calendar even if you are scrolling down. It is possible to create an account and to log in. They provide online tours. They are asking for donations on their website.

2.4. Research Conclusion
The whole research, about the industrial heritage associations and the museum websites, leads to the below conclusion.

There are several associations in different countries for industrial heritage in general or for industrial railway heritage existing. It is possible to find some international partners to create new connections and collect some information to open a new communication network about the industrial railway heritage all over the world.

It has to be considered during the development of the new website, that it has to be clear, uncluttered and user-friendly. It should get to the heart of the most important information. The website has to be memorable and inviting. The visitor’s interest should be aroused by visiting the website. It is important to include some videos and photos to improve the visibility and it would be positive to include some interactivity. But it has to be serious in the interim. It is required to find the correct balance.
3. **Marketing**

One of the most important things for every company is to become popular. They have to assert themselves against a high number of competitors. The market grows constantly and the competition becomes harder.

Therefore promotion is used. Nowadays, many possibilities of advertising exist such as television, radio, posters, brochures and digital displays. However, not only products require promotion websites also need promoting, because if no one visit a website it is useless to have one.

The promotion of a website already starts before the development because selecting a strategy has a high influence on the website construction. It is incorrect to think that it is enough to put the website online and everything will work. A website has to be promoted in the same way as a product.

Thus Online Marketing is used. There are several strategies to popularize and to improve the number of visitors of a website.

These strategies have to be defined in four steps by answering these questions:

- Why – Why is promotion necessary for the website?
- What – What is the added value of the website, what is special/unique at the website?
- Whom – Which are the target groups?
- How – What are the most suitable ways of promotion?

### 3.1. Why?

The aim of the new museum website is to provide more information about several themes such as the Spanish railway history and the conservation of industrial railway heritage. It is to improve the visibility and the service offer of the museum with the purpose to increase the level of awareness.

### 3.2. What?

There is an information gap existing relating to the information about the museum in English, the Spanish history and the conservation of industrial railway heritage. Therefore new content outlined the added value. An additional added value is that the content is short but informative and to the point. To make it as visible as possible many multimedia tools such as videos, photos, plugins and animations are used.

The website offers interesting content, short but informative and important facts and an overview about the museum.

### 3.3. Whom?

Important is to know to whom the website will be focused to detect the best method to approach every target group during the promotion. The target group of this website is diversified. On the one hand there are the non-Spanish museum visitors who desire to obtain information about the museum such as tourists and on the other hand there are train fanatics, students and history enthusiasts.
3.4. **How?**

This question is the most difficult question and it should be considered thoroughly. Not every strategy is efficient for each product. The Online Marketing includes four steps.

- **E- Positioning**
- **E- Advertising**
- **E- Networking**
- **E- Publishing**

3.4.1. **E- Positioning**

This is a measure which receives its effectiveness through the Internet research of the users.

The most important point of the E-Positioning is the search-engine-marketing. It is divided into three parts:

- Optimization of the position
- Registration in tracing services
- Continuous controlling and improving of the position

The procedure is called “Online Research”. This describes the opportunity to put the link of the website on another topic related website or special directories for example webpages about industrial heritage, such as TICCIH or ERH, and about museums. This enables to reach the target groups who are looking for special information such as history or train enthusiast.

With every link on a website the position in a search engine such as google will be improved.

3.4.2. **E- Advertising**

In contrast to the E- positioning this is an active measure. There are several opportunities existing.

One is the banner advertising. This kind of promotion includes high costs for example to design the banner and to put it onto different sources. Usually it has to be paid in order to the clicks. Thousand clicks cost between 10 and 50 Euros.

Another way is to use Keyword advertising. That means to use text advertisements or banner and paid position in search engines to reach a popular place.

Furthermore it is possible to use pop-up windows, ad-breaks or Newsletters.

3.4.3. **E- Networking**

The E- Networking is a procedure of recommendation. For this “Tell-a-friend” –links are used.

Picture 3: example

It is possible to participate in exchange projects which mean that other websites refer to your website and the other way round. A big disadvantage of this method is that the link tempts to leave the website.
More effective is to register in an affiliate network to build an online cooperation with additional content.

**3.4.4. E-Publishing**

All these methods are useless if the content of the website is not high qualitative because the most important advertising method is the own promotion. If the website is clear structured, attractive and interesting it will promote itself because it leads to higher recommendation willingness.

Additionally it is useful to use cross-media-marketing. A positive way is to communicate the URL of the website on merchandise, prospects or employee clothing.

**3.5. Conclusion**

First step for the new website was to use some google analytics and webmaster tools to evaluate the effectiveness of the website and to obtain suggestions how to optimize the search-engine ranking.

Furthermore the website is connected to the social media networks of the museum such as Facebook, twitter and Flickr.

Additionally E-Networking and E-Publishing should be used, by incorporate the URL of the website on topic related websites such as TICCIH and ERIH. Moreover it is a useful strategy to use the cross-media-marketing and place the link on some museum products to indicate to the website, however for the museum it is possible to place the URL at brochures and papers about the museum. Therefore the QR-Code will be used.
4. **Requirements**

Before starting to design and to develop a website it is important to select every requirement from the stakeholders. In the following sections are written the several expectations to be considered during the website design and development.

4.1. **The stakeholder**

Stakeholders of the new website are, next to the team who wants to finish the project in time and do the job as good as possible, the museum, the university and the target groups. The museum and the university are represented by the supervisors.

4.2. **Technic requirements**

It is important that websites work with all usual browsers and not only with one special browser. Another point is a search engine friendly construction. The website should reach a high position at the usual search engines for example google. The most important technical requirement is that the website has to work without any errors on several devices such as computer, mobile phones and tablets.

4.3. **Clients requirements**

Clients expect a website which is fast loaded. That means that it has to renounce big animations or big pictures which take a long time to load. The information, written on the website, has to be clear structured and easy to read, regarding this, a positive font and a correct font size have to be chosen. It is necessary to use a simple language which will be easy to read and to understand.

4.4. **Supervisors requirements**

The Museum supervisor desires a website which expands the official one. It should include all important information about the museum because on the official one the English part is not very well elaborated.
The website should be clear structured and fulfill all the objectives which are explained above. To portray the connection to the official one the colors of the museum should be used. It has to be modern and elegant, attractive and serious.

Additionally it is expected that the website includes many multimedia actions to improve the interactivity of the museum. To reach this goal it is required to incorporate a set of prototype applications and to develop a QR Codes to forward the user directly to the new website.

4.5. **End users requirements**

The target group of the website is diversified. All of their requirements have to be considered, this make the development difficult. It has to be discovered a middle course to reach satisfactory results.

Another point to be considered is the age of the end users because there is a big difference in the requirements between younger and elder people.

4.5.1. **Tourists**

For the non-Spanish visitors the most important thing is to obtain the necessary information about the museum in English. Therefore the museum part has to be well developed and clear structured.

Moreover the progress reports from visitors are decisive to convince tourist to visit the museum.

4.5.2. **Train and history enthusiasts**

For train fanatics it is most important to receive information about the train collection. This part has to be informative and well structured. Moreover photos are necessary.

The history enthusiasts desire to receive facts about the Spanish railway heritage. Therefore the heritage part has to go to the point.

4.5.3. **Difference in the age**

For elder people a website has to be clear and simple to use. Young people expect to have an interactive website with some animations and a large quantity of pictures. They expect a modern design.

4.6. **Conclusion**

All of these requirements have to be considered during the design and the development. Therefore a checklist was created regarding the most important facts and it was deliberated how to satisfy each target group.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Way of consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>All browsers</td>
<td>Test on every browsers</td>
</tr>
<tr>
<td>Search engine</td>
<td>Use SEO(^7) from google analytics</td>
</tr>
<tr>
<td>No errors</td>
<td>Use webmaster tools to test</td>
</tr>
<tr>
<td>Fast loaded</td>
<td>Prevent big animations</td>
</tr>
<tr>
<td>Clear structure</td>
<td>Use not too many nested scopes</td>
</tr>
<tr>
<td>Easy to read</td>
<td>Big font size, contrast</td>
</tr>
<tr>
<td>Informative</td>
<td>Not too long, got to the point, high quality</td>
</tr>
</tbody>
</table>

\(^7\) SEO = Search engine optimization

Clarisse Broyon, Bernhard Schopper, Weronika Walczak, Annika Zloch,

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Table 2: Requirements

<table>
<thead>
<tr>
<th>Connection to official website</th>
<th>Colors of official website, link to the website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive</td>
<td>Multimedia tools such as: Plugins, applications, videos, photos</td>
</tr>
<tr>
<td>Modern, elegant</td>
<td>Use a new template</td>
</tr>
<tr>
<td>Serious</td>
<td>Find the right balance of used colors, positive font, qualitative content</td>
</tr>
</tbody>
</table>

To examine that all the requirements have been considered, a test were executed after finishing the website. This test is explained below.
5. **Website**

The new website is written in English because it is the universal language and opens the possibility for people all over the world to understand the content. Another fact is, that a large quantity of information which are on the official website in Spanish, will be repeated on this website in English.

5.1. **Design of the Website**

To design a website means to choose a nice and attractive user interface. This user interface has to match the already existing corporate identity of the museum. It is important to use an elegant and modern design to appear serious. Next step is to choose a nice font which fits to the user interface and edit photos for the header.

Additionally, the Design includes editing a logo for the website.

5.2. **Development of the Website**

Before starting with the development of the website, the software has to be set up.

The most important thing during the development is to create a database. This means to write the informatics code of the website. Furthermore it includes to build the basic structure and to add some plugins.

The last step is to substitute all the information and structure the content.

5.3. **The software**

There are several software opportunities such as content management systems (CMS), JavaScript Frameworks and Static Webpage with for example HTML5 existing to create a website. It was decided to use a CMS named WordPress. This decision was made for several reasons.

WordPress is free online software to create a website. It is easy to use for beginners because it is not necessary to write any informatics code. This will be done by WordPress. It provides a high number of themes and plugins to create an attractive website or blog in a fast way.

Another advantage of WordPress is the maintainability. It is easy for the clients to maintain the website on their own.

5.4. **The Theme**

There are a high number of themes existing in WordPress. There were three themes from the elegant themes selected and one chosen regarding the requirements.
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The vertex theme looks insipidly and the nexus theme is a kind of calendar and not appropriate for a museum website.

I was decided to use the newest theme “DIVI” for our webpage, because of several reasons.
This theme is clearly arranged and gives a high number of opportunities. It is one of the newest WordPress templates and includes many features and animations. The theme is highly rated in developer blogs because of his elegant and modern design, it looks serious and attractive. Additionally it includes basically a blog.

5.5. **The sections**

The new website is divided in seven main sections. Besides the home, contact and link pages, there are sections about the museum, the heritage, the education and the applications. These sections are divided in subsections as explained below to give a clear overview. They appear in a drop-down menu by moving the mouse on the main section.

5.5.1. **Division of the website**

The website is in general structured in four parts. At the top is a bar containing the social media networks used by the museum such as Facebook and twitter.

![Picture 9: social media networks](image)

Afterwards the navigation bar is presented. The following part is provided for the content and at the end is a bar with a connection to the contact page.

5.5.2. **The menu structure**

![Picture 10: Navigation bar](image)

- Home
- The Museum
  - General information
  - Activities & News
  - Building & Spaces
  - Train collection
- Heritage
  - General railway heritage
  - Spanish and British railway heritage
  - Conservation
- Education
  - Basic information
  - Primary school
  - Secondary school
  - Higher education
- Applications
- Contact
- Links
- Search icon
5.5.3. Previous work
To create the section’s content a great deal of research to each topic was done. For this research several documents from the supervisors were used. Before starting to write the content it was necessary to collect and to sort all the information and to detect the most important points. Afterwards it was important to consider how to visual the content in the website to make it as attractive as possible.

5.5.4. Home
The front page is the most important site because it creates the first view and leaves a lasting impression. The purpose of the front page is to invent the visitor to rummage in the website. The chosen theme includes a big and high quality picture which is an appropriate opportunity to set a definitely positive picture of the museum. Therefore a high quality image is used:

![Picture 11: Front page picture](image)

The front page includes the blog, this enables to illustrate actual comments and impressions from visitors.

Our Blog

![Picture 12: Blog at the home page](image)
Furthermore the users have the opportunity to submit a comment. Therefore a plugin is used called “User submitted post plugin”. The comment has to be published by the administrator of the website to provide inappropriate ones. It is possible to post just a comment or additionally a picture. All the comments are categorized, for example in education and heritage, to enable the possibility to search a special comment. Another opportunity is to select a month to see each post of this month.

Moreover a translation plugin was incorporated to offer a multilingual website. This plugin is a Google translator plugin and is incorporated at each section.

5.5.5. Museum section
This section contains all main information about the museum. It is divided into four subsections: General information, Activities and news, Building and Spaces and Train collection.

In the first subsection, as the name indicated, there is a short description of the museum along with history of its foundation. On the right side from the text a slideshow feature is incorporated containing a photo gallery of the museum areas.

Next subsection is the Activities and News section, which contains information about actual events taking place in the museum. In order to make it more attractive and clear, a calendar plugin has been used. This plugin includes many different possibilities. At the top there are two search tools due to which user can search for specific events by the date or the word finder. Additionally, there is a bar to change the view of the calendar in month view, list or a day view. Depending on which option was chosen the page is changing. Below there is presented the month view.

![Calendar](Picture 14: Calendar)
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Building and Spaces is the third subsection. It contains all the data concerning the buildings on the museum areas. To illustrate them the “image map plugin” has been used. It is an interactive map, to obtain detailed information and pictures the user has to select a number. Afterwards a pop-up window with all data concerning this area will appear.

The last subsection is about the Train collection. In this section several examples of the museum’s trains are listed to provide an insight.

Our train collection

In this section, you can see a couple of trains/locomotives, which are a part of our museum collection. To see our full collection you can visit our Pinterest profile:

- Steam locomotives: https://www.pinterest.com/mineral贩卖/great-locomotives/
- Electric locomotives: https://www.pinterest.com/mineral贩卖/electric-locomotives/
- Diesel locomotives: https://www.pinterest.com/mineral贩卖/diesel-locomotives/

1-1-1 Matarrá Locomotive and three passenger carriages

The surviving vehicles are a reproduction of the original 1.1.1. train. The train reflects the technology and aesthetics of an age when the railway was an essential element of progress. In March 1877 the original Matarrá locomotive was exhibited on a stand at the University of Barcelona. When they tried to bring it down it fell and suffered a great deal of damage leading to its withdrawal. In 1943 a replica was ordered from the Maquinaria Terrestre y Maritime. This locomotive is a 1-1-1 Palatników, the model which in 1950 replaced the European trains, lower and less powerful two-shaft machines.

Picture 15: Interactive map

Picture 16: Train collection

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Each vehicle has its short description and a corresponding photo. The pictures appeared by scrolling down, this effect makes it more attractive. The section is divided into three categories, steam, electric and diesel, as the types of the locomotives.

To provide more information and to illustrate the whole collection there are links referring to the specific category Pinterest album at the top of the page.

5.5.6. Heritage section
One of the most important things of the new website is this section. It is divided in three subsections. The first one is the railway history in general. The second one the history in Spain and the third one is about railway conservation.

In the general history section is written the history from the first wheel up to the first driving locomotive. It is important to illustrate the first steps of the long way to the known steam locomotive.

In the Spanish history can be seen the whole railway development in Spain, from the first railway line up to the closing of the steam locomotives. To make this as visible and interesting as possible a timeline is used. The user has to select a date he is interested in to read more about the historic event. To visual the different speed of development furthermore there is a timeline of the railway development in Great Britain.

To use the timeline plug in it had to be adapted. The color was changed into the museum colors and the style was chosen.
The subsection about the conversation contains a text about the conservation of industrial railway heritage written by Ana Grande. Additionally a map is incorporated. This map illustrates the actions to receive the history of Catalonia’s railway locomotives. Before incorporating it was required to be translated from Catalan to English.

![Map of Catalonia railway museum](image)

**Picture 19: translated map**

### 5.5.7. Education section

Aim of this section is to provide information about several projects the museum was involved.

The educational objectives of the museum are to

- discover the history of the railway through the first original locomotives that worked
- observe the influence of the railway in the industrial and social development
- spread the history and development of the railway
- discover the history of the railroad through the different energies that have been used and the various elements of the industrial landscape, railways in particular
- transmit influence in other areas not specifically rail transport such as urban and territorial configuration

The museum collaborates with different institutions and organizations in order to transmit the history, evolution and the advantages of rail as a transport medium from the past to the future.

To illustrate these projects the section is divided into three subsections beside the basic information, the primary school, the secondary school and the higher education. The basic information includes the objectives mentioned above and additionally two videos about the steam and high speed locomotives. This subsection is supposed to provide basic data about the whole section.
In the higher education section the collaboration between several universities and the museum are mentioned. Among other things the EPS project from last year and from this year can be seen. To improve the visibility and the interactivity an accordion plugin is used to illustrate the projects.

The user obtains further information by clicking on the title. Afterwards, if another title is selected, the entry selected closed. This effect seems to be an accordion.

5.5.8. Application section
During several projects the museum received some prototypes of mobile phone applications, which are incorporated in this section. They were developed by using Justinmind, free online software to create prototype applications. Each of the prototypes contains a short description, a list of the authors and the subject for which it was created.
They are presented with a main poster and a QR-Code to be scanned to transmit the application directly to the smartphone.
The section provides a “museum guide”, a “museum game”, a “museum and accessibility” application, a “museum visit for students” application and the “interactive visit”, which was developed by the last year’s group, existing.

It is used the same effect for the pictures as in the train collection. The pictures appear one by one by scrolling down.

5.5.9. Contact
This section is to contact the museum and to demonstrate where the museum is located. Therefore a map is used.

![Location map](image)

**Picture 22: Location map**

Additionally, a contact formula is incorporated.

![Contact formula](image)

**Picture 23: Contact formula**

To improve the relationship between the user and the museum and to appear more personal a picture of the contact person Ana Grande (head of education and communication at the museum) is included in the side bar.
5.5.10. **Links**
With the purpose to provide the user further information this section is used. It includes links to social media networks used by the museum and to the museum partners. This section is used to do the marketing strategy called E-Networking because it recommends to other websites. If the museum is going to use the E-Publishing method and wants to do some Online Research, this section can be used to include the links of topic related websites such as TICCIH or ERIH.

6. **Website transfer**
A really important part of the project was to transfer the website, because the website was formerly on another web space. Therefore a new web space with the URL “www.railway-heritage.com” was provided and the transfer was done.

6.1. **Steps of transformation**
This has been realized in the following steps:

- export of the existing database
- export of the “wp-content” folder from the old server
- installation of WordPress on the new web space
- installation of the theme “Divi” on the new web space
- replacement of the “wp-content” folder on the new web space with the “wp-content” folder of the old web space
- import of the existing database in the new web space
- rewrite of the “wp-config.php” file, to connect it with the new database
- use of the relocate PHP function to replace the URLs of the new site

Furthermore the website will be incorporated in the education part of the official website.

6.2. **Problems during the transfer:**
One problem at the transfer was the connection of the new site to the new database. There have been failures in the “wp-config.php” file, thus the connection to the server has not been provided. The main problem was that the new server is, in contrast to the old one, a localhost. Therefore the host definition was required to be changed.

---

8 This file contains the whole content of the website
9 This file is to connect the website with the database
### 7. Website testing

After finishing the website it was important to undertake it a few tests to examine that the website fulfills all the requirements. The Website was tested in usability and satisfaction to ensure its effectiveness and efficiency.

Therefore different methods could be used. To select the best method fitting in the scope of the project, some information was collected and methods compared.

#### 7.1. Usability and satisfaction test

There are various measures to test the usability but not every is suitable for every situation. To figure out the most efficient method for the museum website and this project the various methods have been explained and compared.

##### 7.1.1. Task Analysis

In this kind of usability test the operating range of a website is emphasized. Therefore the various tasks of a website have to be selected. For each task a “User case“ has to be created in which the supposed behavior of the user is simulated.

The aim of this analysis is to figure out

- How the users try to reach their goals
- How their physical environment influence them
- How their precious knowledge influence them

For example:

![Picture 24: Task analysis](image-url)

---

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This method has to be undertaken in an early state of the website developing to figure out some requirements which have to be considered during the creation of the website.

7.1.2. Contextual Inquiry
In comparison to the task analysis, which is a theoretic method, this is a practical testing. The aim is to obtain information about the behavior of users in their usual environment.

Therefore an interview of some users in their usual environment for example the working place has to be done. During this interview the reaction of the users are studied.

7.1.3. Focus groups
This is a practical testing too, not with one single person but with a homogeneous group of people. They are taken into a kind of discussion moderated by a neutral person.

The aim of this method is to receive some suggestions for improvement. Moreover, it is possible to use this kind of method as an online questionnaire.

It should be done either before the developing process to receive ideas or during the creation to obtain suggestions to improve the work.

7.1.4. Users-diary
In this method users notice their impressions in determined periods. This is a long procedure but it enables the possibility to obtain information in a real-time relationship.

7.1.5. Onsite questionnaire
To use onsite questionnaires is one of the most popular testing. A determined number of visitors were asked to rate the website. It is possible to rate immediately, later or never.

7.1.6. Panel questionnaire
Determined target groups are queried by means of online panels. This is used for example by requirements-, satisfaction- and benchmarking analysis.
7.1.7. **Personas**
In this method Personas are created. These are User models created by using quantitative and qualitative user data. The Personas will be granted as the potential users and the requirements will be derived by them.

7.1.8. **Expert evaluation**
Experts will evaluate the website with means of usability guide lines. At first each expert is testing the website on his own and moved into the situation of a usual user. Afterwards problems will be collected and evaluate on the basis of guide lines. The aim is to identify possible use- and comprehension problems.

7.1.9. **Labor testing**
This is a method executed in a Labor with scenario based and target grout specific tests.

The aim is to figure out weak points, improvement possibilities and how to improve the way to reach determined goals.

The users are observed by experts who are sometimes asking questions to obtain impressions. Video and audio recording can be used to be evaluated later.

7.1.10. **Eye tracking**
Eye tracking opens the possibility to follow the views of the users by using infrared technic.

7.1.11. **Web Controlling**
This method is just mentioned to complete the list because it is explained in detail below. It includes webmaster tools and analytics.

7.2. **Requirements**
It has to be selected the most efficient method for these project. Therefore different requirements were set and a comparison within these categories has been made. It has to be considered that there is no much time left to test the website. It should be simple and short, because no one is into answering a long lists and questions or spend much time. Additionally, it has to be effective to receive some suggestions for improvement.

It is used the same rating system as for the Museum website. Best rating is a triple plus (+++) worst is a minus (-).

<table>
<thead>
<tr>
<th>Method</th>
<th>simple</th>
<th>quick</th>
<th>available</th>
<th>for various users</th>
<th>useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task analysis</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Contextual inquiry</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Focus groups</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>User Diaries</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Onsite Questionnaire</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+++</td>
<td>+</td>
</tr>
<tr>
<td>Panel Questionnaire</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Personas</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Expert evaluating</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Labor test</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Eye tracking</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3: Usability test comparison
7.2.1. Conclusion
Many of the testing methods are not suitable for the project because of the time limit and the capacity. The most efficient method is the onsite questionnaire however the website is not available with a real URL at this state of the project, it was transformed to a usual questionnaire. This questionnaire was created by using free online software. This software creates a link which can be sent to various people to obtain feedback.

During the creation of the questionnaire a list of requirements have to be considered.

- It has to be anonymous
- It should be used easy language because everyone has to understand the questions
- It should be well prepared and didn’t took too much time of the user
- If rating questions are used, an even number of possibilities has to be chose because it is important to have a clear decision

7.3. Questionnaire construction
The test commence with information about the user such as profession, age and device. It is to ensure at the evaluation that it was done by different target groups. Afterwards general questions about the previous knowledge of the user such as knowledge about railway history are asked and what they expect from a website and what the most important information to be provided by a museum website are.

Moreover the user was asked to visit the website and try to find information regarding the museum such as how many buildings exist. This was used to examine if the website is clear structured and the information is easy to find.

The next page contains several questions to be answered by choosing either totally agree, agree, disagree or totally disagree. For example, it was asked if the expectations are fulfilled or if the site loading time is reasonable.

Finally the user was asked for comments about the best and the worst things and to leave improving suggestions.
8. **Evaluation**

The questionnaire was closed after two weeks. It was distributed by sending a link to several contacts from the team members and the supervisors to obtain answers from a wide range of people.

Afterwards the answers were evaluated and demonstrate in diagrams as mentioned in the annex. In total 26 persons participated at the questionnaire.

The first part of the questionnaire was about general information such as the previous knowledge of the users.

![Figure 1: Previous knowledge](image1.png)

This enables to obtain an overview and an impression about the respondents. It was important to receive an overview about the initial situation.

One of the most important questions was about the user expectations at a website. Therefore it was possible to choose four answers.

![Figure 2: Expectations](image2.png)
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It can be seen that the users expect most a clear structure, high quality content and pictures.

Additionally it was asked which information a museum website should contain. The most important information is the location.

Furthermore the user was asked to rate the website in several categories:

<table>
<thead>
<tr>
<th>Website</th>
<th>totally agree</th>
<th>agree</th>
<th>disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>easy to find asked information</td>
<td>28.57%</td>
<td>71.43%</td>
<td>0.00%</td>
</tr>
<tr>
<td>site loaded time is reasonable</td>
<td>16.67%</td>
<td>83.33%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Contrast</td>
<td>28.57%</td>
<td>71.43%</td>
<td>0.00%</td>
</tr>
<tr>
<td>font size</td>
<td>33.33%</td>
<td>44.44%</td>
<td>22.22%</td>
</tr>
<tr>
<td>not-found</td>
<td>75.00%</td>
<td>25.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>place of logo</td>
<td>22.22%</td>
<td>55.56%</td>
<td>22.22%</td>
</tr>
<tr>
<td>picture loaded time</td>
<td>16.67%</td>
<td>66.67%</td>
<td>16.67%</td>
</tr>
<tr>
<td>clear path to museum information</td>
<td>20.00%</td>
<td>80.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>clear path to contact</td>
<td>28.57%</td>
<td>71.43%</td>
<td>0.00%</td>
</tr>
<tr>
<td>navigation is easily</td>
<td>12.50%</td>
<td>75.00%</td>
<td>12.50%</td>
</tr>
<tr>
<td>labels are clear</td>
<td>14.29%</td>
<td>71.43%</td>
<td>14.29%</td>
</tr>
<tr>
<td>number of buttons reasonable</td>
<td>50.00%</td>
<td>33.33%</td>
<td>16.67%</td>
</tr>
<tr>
<td>logo is linked to homepage</td>
<td>50.00%</td>
<td>50.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>headings are clear</td>
<td>42.86%</td>
<td>57.14%</td>
<td>0.00%</td>
</tr>
<tr>
<td>styles and color</td>
<td>42.86%</td>
<td>57.14%</td>
<td>0.00%</td>
</tr>
<tr>
<td>interesting content</td>
<td>42.86%</td>
<td>57.14%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Appealing</td>
<td>50.00%</td>
<td>50.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>design is modern and elegant</td>
<td>50.00%</td>
<td>50.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>expectations are fulfilled</td>
<td>50.00%</td>
<td>50.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Table 4: Website rating
All in all the respondents were satisfied with the website. The expectations were to 50% totally fulfilled and to 50% mostly fulfilled.

The users were asked to leave suggestions for improvement and the most suggestion was to improve the loading time of pictures.

9. **Rework of the website**

Regarding the evaluation a rework of the website was done. Therefore a list with the critics was developed.

<table>
<thead>
<tr>
<th>Critic</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture loaded time</td>
<td>Use smaller images</td>
</tr>
<tr>
<td>Site loaded time</td>
<td>Reduce the front page picture</td>
</tr>
<tr>
<td>Opening hours</td>
<td>Add at home page</td>
</tr>
<tr>
<td>Font size</td>
<td>Enlarge the font size</td>
</tr>
<tr>
<td>No-found pages</td>
<td>➔ Because of the transformation</td>
</tr>
</tbody>
</table>

Table 5: Critics

To improve the loading time of the website the picture at the home page was reduced. The same procedure was done with the other pictures. During this work it was to consider that the quality of the pictures didn’t decreased.

Additionally the font size was increased, especially the font size of the content in the plugins.

Furthermore the opening hours of the museum were incorporated at the sidebar of the home page.

Picture 26: Opening hours
10. **Google Analytics**

With regard to improve the website and to increase the popularity and the number of visitors Google Analytics was used. This is a method to examine the effectiveness of the website and to obtain suggestions how to improve it.

10.1. **General information**

Google Analytics is a free web analytics service offered by Google that tracks and reports website traffic. Google launched the service in November 2005 after acquiring Urchin.

Integrated with AdWords, users obtain the possibility to review online campaigns by tracking landing page quality and conversions (goals).

Google Analytics launched Real Time analytics, a tool to see how many people are on the website at this moment, where they are from and what they are viewing. Additionally it provides knowledge whether new content on the site is popular, actual promotion increase the number of visitors and whether tweets and blog posts leads to immediate effects.

Furthermore, Google Analytics works with a cookie which stores a unique identifier, the website is able to recognize if a visitor returns. Additionally it stores information about the pages visited by the browser. This means that it reported when the browser is seen on the website, how long the browser was seen on the website, the IP address, which allows the Google Analytics to infer the browser's location, and what site the browser was examined before arriving at the site (the previous URL).

By default, this information is accessible only for the website publishers through the Google Analytics tools and it is not shared with anyone else. It is a first-party cookie.

The key factor is to understand where the visitors are going after leaving the page. To understand the outbound link behavior of the users enables to optimize the website for conversion and the brand messaging for strategically maximum effect.

10.2. **Google Analytics in WordPress**

For using Google Analytics with WordPress a plugin exists which could be incorporate to obtain an overview about the visitor’s behavior.

The museum is already registered in it because it is used for the official website. It was possible to add a new domain to incorporate this plugin at the new website as well.

The website is new and not really popular at this moment for that reason there are not many results existing. But for the future it will be a useful method to increase the popularity and to improve the website.
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11. **QR Codes**

Museums and tourist offices, and in general cultural locations, are using QR codes increasingly to provide further information for smartphone users by incorporating a link to a website. It is even common to use a QR code to transmit a sound file to listen to some commentary as a kind of a guide. Additionally it preserves the user to copy the URL to the mobile phone.

Regarding this increase, and to improve the interactivity of the railway museum a QR Code was created to receive a connection to the new website [www.railway-heritage.com](http://www.railway-heritage.com)

11.1. **General knowledge**

The QR Code is a kind of matrix barcode, composed of black modules in a square grid on a white background. The arrangement of those modules defines which information is contained.

It was created by a Japanese company in 1994 for the automobile industry to be read quickly by a scanner, a smartphone or a webcam. Therefore this code was named QR, in fact Quick Response code.

This type of code has many advantages. It is possible to incorporate more data than in a usual barcode, furthermore those data can be transmitted easily by an application. Consequently it enables to receive a speed access to a website, video, photo or another kind of link such as to a social media network.

11.2. **Advantages of a QR Code**

The QR code is a qualified way to receive data for many reasons.

The first advantage is that a QR code allows storing more data than a classic barcode on a smaller place. While a conventional barcode stores a maximum of approximately 20 digits a QR Code is able to handle up dozen to hundred times more information. Furthermore, it is able to contain all types of data such as alphanumeric characters, symbols, binary and controls codes. It is possible to encode up to 7,089 characters in one QR code. However, in a tenth of the space a classical barcode required for the same amount of information. This is possible because it is listed vertically and horizontally.

The second benefit of this kind of code is that it is simple to read. On the one hand it uses high speed reading technology and on the other hand in omnidirectional position (360°).

The third advantage of the QR code is that it resists to possible damages such as printing errors or dirt, it stays readable. The QR code is capable to correct errors. The data can be restored because there are up to 30% redundancy of information in the QR code.

The last but not the least positive aspect of the QR code is that it is easy to use by the consumer. They just have to upload a QR reader. Afterwards, the application gives a directly access to the data or the webpage. Moreover, it is not difficult to create a QR code by using a generator at the internet. It is required to write the desired data and the generator will transform it in QR code.
11.3. Construction of a QR Code

The QR code is composed of different parts, it is composed of black and white squares which called modules. Each module represents a binary value:

- Black  $\rightarrow$ 1
- White  $\rightarrow$ 0

The QR code is structured as explained in Picture 28: Construction of QR Code, each part of it defines a different form of information or action used for the readability of the code.

The area of the symbol is divided into two application ranges, the function pattern and the encoding region.

The encoding region incorporates all necessary functions for the data encoding such as error corrections, information about the version and the format.

The function pattern permits the quickly readability of the code by using different elements such as required patterns or detection position patterns. Those elements are quite important because they enable to assure the positive position and orientation of the symbol in the space.

The part which is not incorporate in the symbol is the Quiet zone. This zone is not compulsory however it facilitates the reading of a QR code, as a consequence this zone is strongly recommended.

Picture 28: Construction of QR Code
11.4. Types of QR Codes
There are several types of QR code existing as portrayed in the table below.

<table>
<thead>
<tr>
<th>QR Code Model 1 and Model 2</th>
<th>Micro QR Code</th>
<th>iQR Code</th>
<th>SQRC</th>
<th>LogoQ</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="QR Code Model 1 and Model 2" /></td>
<td><img src="image2" alt="Micro QR Code" /></td>
<td><img src="image3" alt="iQR Code" /></td>
<td><img src="image4" alt="SQRC" /></td>
<td><img src="image5" alt="LogoQ" /></td>
</tr>
</tbody>
</table>

[Feature]
Model 1 is the original QR Code. The largest version of this code is 14 (73 x 73 modules), which is capable of storing up to 1,167 numerals.
Model 2 is an improvement on Model 1 with the largest version being 40 (177 x 177 modules), which is capable of storing up to 7,089 numerals. Today, the term QR Code usually refers to this type.

[Feature]
Only one orientation detecting pattern is required for this code, making it possible to print it in a smaller space than before. This code can be viable even if the width of its margin is 2 module-width (QR Code requires a margin of 4 module-width at least around it). The largest version of this code is M4 (17 x 17 modules), which can store up to 35 numerals.

[Feature]
Code that can be generated with either square modules or rectangular ones. Can be printed as a turned-over code, black-and-white inversion code or dot pattern code (direct part marking). The maximum version can theoretically be 61 (422 x 422 modules), which can store about 40,000 numerals.

[Feature]
QR Code that has a reading restricting function. Can be used to store private information or manage a company's internal information. Its appearance is no different from the regular QR Code.

[Feature]
QR Code that can incorporate high-levels of design features such as illustrations, letters and logos. Since proprietary logic is used in generating this type of code, its readability is not compromised.

Picture 29: Types of QR codes

For the project it was decided to use Model 1 because it is the original QR code and the common one reading by smart phone applications. Additionally it is free and simple to create by a generator website.

11.5. Created QR-Code
This QR-Code forward the user directly to the new website www.railway-heritage.com

Picture 30: New QR-Code
12. **Conclusion**

The railway museum of Vilanova I la Geltrú has been in contact with the university since few years now. Since the start of this collaboration different teams assist the communication service of the museum to improve the visitor’s experience and its visibility. This year the study looks at merging both, old and new technologies, to receive a better and more interactive experience. Moreover, this project was to enable a better access to the information about industrial railway heritage and the museum on the Internet. The previous work and the research involved to expand the actual website with a new one. The content in English about railway heritage, the museum, education and conservation were well developed by using different types of plugging, which permit agreeable and attractive access to information. The website has been finished, one time and meets the requirement of the museum. This website is now available with a real URL: www.railway-heritage.com. Nevertheless an evaluation test has been done to improve and adapt the website to the expectation of the user. This opened the opportunity to obtain an external view at our project which permitted to assure that the website meet all expectations. Moreover, to complete this work, a QR–Code has been created to introduce a better interaction with the visitor in the museum. This QR-code offers a fast access to the new website directly from the smartphone, which will improve the interactivity and will receive further information during the visit. To terminate this project we assured that the communication service of the museum can easily improve the content or maintain the news and activities by itself.

In conclusion this project was a beautiful human experience, all members of the team learned how to work together and how to create a group synergy, which allows meeting all objectives of this project under proper conditions.

13. **Further research**

Regarding the expectations of a high quality, the content of the website has to be improved. There is already a translation function however this is just a word to word translation. To improve the offered service the content has to be translated to provide a multilingual website. Additionally the news and activities section is required to be updated regular. In order to become more popular some marketing has to be done and to examine the results from the Google Analytics tool regular. It is also important to improve the interactivity for example by including virtual visit of trains or some sounds.

14. **Acknowledgment**

We like to thanks all people involved in this project. A special thank goes to our supervisors for their great support and their huge investment in our project. They spend much time to help us to finish the project as good as possible. Thank you, Ana and Pere.

Additionally we like to thanks all the teachers of this project semester for their preparation and their support during the project. Moreover the investment from the international office team has to be acknowledged, thank you for your time in every respect. Last but not least we would like to mention our families and friends. Without your support the participation at this project would not be possible.
References

Literature


Internet

1.2 Museu del ferrocarril de Catalunya [Website] citied 20/04/2015 URL: http://museudelferrocarril.org/

2.2.1 FEDECRAIL [website] actualized 15/01/2015 [cited 18/03/2015] URL: http://www.fedecrail.org/

2.2.2 TICCIH [website], hosted by Michigan Technological University, copyright 2015 [cited 18/03/2015] URL: http://ticcih.org/

2.2.3 European Rail Congress [website], Copyright Portobello Partnership LTD 2012 [cited 18/03/2015] URL: http://www.europeanrailcongress.com/summit.php

2.2.4 European route of industrial heritage [website] actualized 15/04/2015 [cited 18/03/2015] URL: http://www.erih.net/

2.2.5 Heritage railway association [website] copyright heritage railway association 2015 [cited 18/03/2015] URL: http://www.heritagerailways.com/


2.2.7 Steam Heritage [website] copyright 2015 steam heritage publishing LTD [cited 18/03/2015] URL: https://www.steamheritage.co.uk/


2.3.1 Rijksmuseum [website] citied 26/03/2015 URL: https://www.rijksmuseum.nl/

2.3.2 Museo nacional del prado [website] copyright 2015 Museo del prado [cited 26/03/2015] URL: https://www.museodelprado.es/

2.3.3 Cooper Hewitt [website] copyright by Smithsonian [cited 26/03/2015] URL: http://www.cooperhewitt.org/

2.3.4 Louvre [website] [cited 26/03/2015] URL: http://www.louvre.fr/

3 Online Marketing- die eigene Website bekannt machen by Silvana Borsutzky [online] published 07/2002 [cited 20/05/2015] URL: http://www.scoreberlin.de/usability-artikel/online-marketing/
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4.2, 4.3 webdesign loy [website] [cited 20/04/2015]
URL: http://www.loy-webdesign.de/webdesign/webdesign.htm

5 Catalonia railway museum and heritage [website] by Annika Zloch, Clarisse Broyon, Weronika Walczak and Bernhard Schopper published 2015
URL: http://www.railway-heritage.com/

5.5.4 WordPress.org – plugin directory [website] updated 08/05/2015 [cited 07/06/2015]
URL: https://wordpress.org/plugins/user-submitted-posts/

5.5.4 WordPress.org - plugin directory [website] updated 02/12/2014 [cited 07/06/2015]
URL: https://wordpress.org/plugins/google-language-translator/

5.5.6 Railway history [website] la historia de los ferrocarriles del Estado Espana [online] published 2009 [cities 09/04/2015]
URL: http://www.railway-history.de/renfehistoria.htm

5.5.6 Geschichte der Eisenbahn by Torsten Berndt [pdf document] [cited 13/04/2015]
URL: https://www.maerklin.de/media.php/de/pdfs/geschichtedereisenbahn.pdf

5.5.6 Geschichte der Eisenbahn by Rolf Stephan and Tobias Aufmkolk [online] published 03/05/2012 [cited 13/04/2015]
URL: http://www.planet-wissen.de/natur_technik/eisenbahn/geschichte_der_eisenbahn/

7 Usability-Test - 16 Methoden zur Messung der Usability by Martin Beschnitt [online] [cited 21/05/2015]
URL: http://www.onlinemarketing-praxis.de/web-usability/usability-test-16-methoden-zur-messung-der-usability

10.1 Google Analytics [Google-tools] [cited 06/06/2015]
URL: https://www.google.com/intl/en_uk/analytics/index.html

10.1 6 Powerful Google Analytics Features [online] by Kurt Edelbrock [cited 07/06/2015]
URL: https://www.hongkiat.com/blog/google-analytics-why-you-probably-dont-need-the-rest/

10.1 9 awesome things you can do with google analytics 5 [online] by Kristi Hines [cited 07/06/2015]
URL: https://blog.kissmetrics.com/awesome-google-analytics/

11 QR Code© Le code-barres version 2D by Mickaël De Almeida [online] published 2012 [cited 28/05/2015]
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Made by an employee of the museum

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Created by Clarisse Broyon

Clarisse Broyon, Bernhard Schopper, Weronika Walczak, Annika Zloch,
Supported by the EPSEVG, UPC BarcelonaTech, and the Museu del Ferrocarril de Catalunya
Annex

General history
This is the content of the “General history” section at the website.

The industrial revolution
The industrial revolution started in the early nineteenth century by developing the first steam engine. Until then people traveled by horse caused that the speed was limited. It was impossible to cover long distances for poorer people because they can’t afford a horse.

Suddenly, through the steam locomotive it was possible to cover long distances in a speed never done before. Additionally, the steam locomotive enables poorer people to travel.

This development opened a great deal of new markets. The engine steam initiated the industrial revolution.

But in the twentieth century cars and trucks became more popular and many railways lines were decommissioned. Nowadays the steam locomotives were replaced by diesel and electric motor power.

The development from the first wheel to the first locomotive
In ancient times the people used logs to move heavy stocks. But this was definitely bulky so they started to cut the logs into pieces and fixed them on the containers. This was how the first wheel was invented.

The streets in this time were out of sand and if it starts to rain the wheels sink down and left deep ruts. Soon the people created these ruts consciously to direct the vehicles.

In the late 15th century the first rails, out of wood, were found in Europe. They used parallel wood rails in the mines and wheels with flanges. But this solution was too wobbly so that they change the material from wood into iron in 1750. The wheels received iron mountings. This led to less friction loses but the rails were often broke.

The question how to replace horses with a more powerful engine rose in the late 18th century. There was only one solution, the steam engine. But it was too heavy, too big and too weak for mobile vehicles.

At first in 1804 the first useful locomotive was found by Richard Trevithick, a British engineer. He mounted a small but powerful high pressure stem engine on a chassis. The first locomotive was driven in a mine of Wales with five wagons, filled with ten tons iron and 70 workers.

But Trevithick’s locomotive failed because of the fragile rails and missed investors.

The next important and successfully person in the railway history was George Stephenson, another British engineer. He took the locomotives out of the mines and improved the rails by using rolled iron.
On the 27th of September in 1825 the first railway line was opened between Stockton and Darlington. It was a 40 km long line and the locomotive was called “locomotion”.

**History in Spain**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/11/1837</td>
<td>First Spanish railway line on Cuba 28 km between Guines and La Havana</td>
</tr>
<tr>
<td>1840</td>
<td>Miqel Biada(^{10}) desired a line between Barcelona and Mataró. To realize his goal he traveled to the then center of railway development London. Josep Maria Roca(^{11}) became Biadas partner.</td>
</tr>
<tr>
<td>30/06/1843</td>
<td>Roca applied the concession to build the railway line (Barcelona – Mataró)</td>
</tr>
<tr>
<td>1844</td>
<td>Subercase Report&lt;br&gt;This report, named after an engineer, is about technical, legal and economic aspects. Because of this report, a committee decided to set the gauge at 1668 mm known as the Iberian gauge.</td>
</tr>
<tr>
<td>1845</td>
<td>Foundation of the “Gran Compania Espanola del Camino del Hierro de Barcelona a Mataró y viceversa”(^{12})</td>
</tr>
<tr>
<td>1847</td>
<td>The financial crisis led to complications</td>
</tr>
<tr>
<td>02/04/1848</td>
<td>Miquel Biada died before the line was finished</td>
</tr>
<tr>
<td>28/10/1848</td>
<td>Opening of the 30 km long railway line. The opening train was led by the 1-1-1 Mataro which replica can be seen in the Museum of Vilanova I la Geltrú. It had 25 wagons for 900 passengers. It started at the Barcelona station Estació de França stopped at the station in Badalor and El Masnou and ended in Mataró. The engineers used another track gauge (1674 mm instead of the in Europe common 1435 mm).</td>
</tr>
<tr>
<td>1851</td>
<td>Queen Isabell II opened the second railway line. It was a 49 km long line between Madrid and Aranjuez.</td>
</tr>
<tr>
<td>1854</td>
<td>Inauguration of the lines between Barcelona and Granollers and between Valencia and Xàtiva.</td>
</tr>
<tr>
<td>1855</td>
<td>First Spanish law for railways. Meanwhile the whole railway line was about 400 km.</td>
</tr>
<tr>
<td>1856</td>
<td>Foundation of M.Z.A (Madrid to Zaragoza)</td>
</tr>
<tr>
<td>1856</td>
<td>Foundation of “La compania del Hierro del Norte de Espana”. They opened a line between Madrid and Irun.</td>
</tr>
<tr>
<td>1875</td>
<td>Expansion of Norte by receiving lines in Catalonia and beside the coast.</td>
</tr>
</tbody>
</table>

\(^{10}\) A Catalan Engineer  
\(^{11}\) Company financer  
\(^{12}\) Big Spanish railway association from Barcelona to Mataró and back
History in Great Britain
Great Britain was the starting point for the railways.

The British engineer Threvithick was the developer of the first steam locomotive and the first railway line was in south wales. But let’s see what happens exactly in comparison to Spain...

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1804</td>
<td>First steam locomotive</td>
</tr>
<tr>
<td>1823</td>
<td>Permission through the English parliament to transport persons with a steam locomotive</td>
</tr>
<tr>
<td>1825</td>
<td>First person transporting steam locomotive “locomotion” between Stockton and Darlington it could carry 21 coal wagons 25 miles at 8 miles per hour</td>
</tr>
<tr>
<td>1829</td>
<td>the Rainhill Trials took place (a competition to discover what train and which type of train would be best for a new line between Manchester and Liverpool) The winning train was the legendary &quot;Rocket&quot; built by George Stephenson</td>
</tr>
<tr>
<td>1830</td>
<td>The line between Manchester and Liverpool opened</td>
</tr>
<tr>
<td>1838</td>
<td>Robert Stephenson, the son of George, completed the London to Birmingham rail line</td>
</tr>
<tr>
<td>1841</td>
<td>The London to Bristol line - the Great Western Railway was completed. The people used the rail line's initials (GWR) to call it &quot;God's Wonderful Railway&quot;</td>
</tr>
<tr>
<td>1825 to1835</td>
<td>Parliament agreed to the building of 54 new rail lines</td>
</tr>
<tr>
<td>1836 to 1837</td>
<td>39 new lines.</td>
</tr>
<tr>
<td>1900</td>
<td>Britain had 22,000 miles of rail track</td>
</tr>
<tr>
<td>1923</td>
<td>all the railways in the country were grouped into four new companies (the “Big Four”):</td>
</tr>
<tr>
<td></td>
<td>- The Great Western Railway (GWR)</td>
</tr>
<tr>
<td></td>
<td>- The London, Midland &amp; Scottish Railway (LMS)</td>
</tr>
<tr>
<td></td>
<td>- The London &amp; North Eastern Railway (LNER)</td>
</tr>
<tr>
<td></td>
<td>- The Southern Railway</td>
</tr>
<tr>
<td>1948</td>
<td>Nationalization of the British railways</td>
</tr>
<tr>
<td>Mid 1950s</td>
<td>Plans for modernizations</td>
</tr>
<tr>
<td>1963</td>
<td>Beeching Report -&gt; many railways had outlived their usefulness and must be closed</td>
</tr>
<tr>
<td>End of 1960s</td>
<td>The steam railways were replaced by diesel and electric engines</td>
</tr>
</tbody>
</table>
Questionnaire

This questionnaire was developed at [www.umfrageonline.de](http://www.umfrageonline.de) to test the new website.

**Website testing**

**Page 1**

Please help us to improve our website, we developed in scope of the European Project Semester, by answering this questionnaire. All you need is five minutes time, an internet capable device and Internet.

**Your information**

- Profession
- Age
- Device
- Browser
- Type of internet connection

**Page 2**

Please answer the following questions:

- Do you have previous knowledge about railway history in general?  
  - yes
  - no

- Do you have previous knowledge about railway history in Spain?  
  - yes
  - no

- Did you know the Catalonia railway museum before?  
  - yes
  - no

- Did you already visited the museum?  
  - yes
  - no

- Are you interested in railway locomotives?  
  - yes
  - no
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Page 3

What do you expect from a website? You can choose up to 4 possibilities

- Accessibility on any devices
- Videos
- Clear structure
- Comment function
- Pictures
- High quality content
- Multilanguage
- Informative
- Others

What are your expectations regarding to a website about railway heritage?

What are the most important information about a museum you want to know? You can choose up to 3 possibilities.

- Opening hours
- Location
- Collection
- Entrance fee
- Contact
- Activities
- Others

Page 4

Now, please have a look at the website: www.railway-heritage.com (Please copy and paste the link into the URL bar)

What is your first impression of the website?

Please, try to detect the following information (you don’t need to write anything):
1. Where can you submit a comment?
2. How many buildings does the museum have?
3. Where was the first Spanish railway line?
4. Who is the contact person of the museum?
5. Does the museum have projects in the primary school?
6. How can you try the applications?
### Developing multimedia actions for the Catalonia railway museum

11 Juni 2015

Clarise Broyon, Bernhard Schopper, Weronika Walczak, Annika Zloch, Supported by the EPSEVG, UPC BarcelonaTech, and the Museu del Ferrocarril de Catalunya

#### Page 5

**Please answer the following questions**

<table>
<thead>
<tr>
<th>Question</th>
<th>totally agree</th>
<th>agree</th>
<th>disagree</th>
<th>totally disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was easy to find the asked information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site loaded time is reasonable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate text-to-background contrast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Font size/spacing is easy to read</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site has no “not-found/404” page</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company logo is prominently placed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The pictures are fast loaded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear path to museum information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear path to contact information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main navigation is easily identifiable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigation labels are clear and concise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of buttons/links is reasonable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company logo is linked to homepage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major headings are clear and descriptive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Styles and colors are consistent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content is interesting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The website is appealing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The design is modern and elegant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My expectations are fulfilled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Page 6

**What do you like the most and why?**

...
What do you like the worst and why?

Do you have any improving suggestions?

Page 7

Why do we need your profession and your age?
This questionnaire is sent to various target groups of the website. People in different ages and with different professions have different requirements to a website. We like to know how big the influence of the age and the profession is.

Why do we need the device, browser and internet type?
The website should be available for any devices such as tablets, computers and smartphones. Same requirement applies for the various browsers. It should run on every browser without any errors. Sometimes pictures are not fast loaded because of the internet quality, therefore we need to know which type of internet you use for the test.
Developing multimedia actions for the Catalonia railway museum

11 Juni 2015

Website testing – evaluation
The evaluation of the questionnaire except the diagrams mentioned above.

<table>
<thead>
<tr>
<th>Profession</th>
<th>Students, Project manager, journalists, computer experts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20-54</td>
</tr>
<tr>
<td>Device</td>
<td>PC, Laptop, mobile phone</td>
</tr>
<tr>
<td>Browser</td>
<td>Google Chrome, Mozilla Firefox</td>
</tr>
<tr>
<td>Internet</td>
<td>Wi-Fi, DSL, cable, Ethernet</td>
</tr>
</tbody>
</table>

Are you interested in railway locomotives

- Yes: 27.27%
- No: 54.55%

Previous knowledge about railway history in Spain

- Yes: 36.36%
- No: 63.64%
Did you know the museum before?

- Did you know the museum before?
  - Yes: 45.45%
  - No: 54.55%

Did you already visit the museum?

- Did you already visit the museum?
  - Yes: 45.45%
  - No: 54.55%

8. What are your expectations regarding to a website about railway heritage?

Anzahl Teilnehmer: 6
- The website should present information about track sections, articles about important railways and railway stations such as pictures, historical evolution and maps showing track courses. It should be structured in a way that allows filtered access by time and location, so that I can get all track courses etc. that satisfy these conditions.
- Also links for detailed information (if the website doesn’t offer all of it) would be nice.
- For it to be presented as the story it was, but just as an appetizer and state clearly opening hours, holidays and prices! Besides the content itself, of course, - I think all the above mentioned are pretty important!
- Animations and/or a clear theme with railway and locomotives.
- Detailed history and anecdotes about trains.
- Keep it simple in format, structure, but quality content!
- Clear information easy to read
- A lot of real information and interactivity
10. What is your first impression of the website?

Anzahl Teilnehmer: 5

- Title image loads too slow, a lower resolution and an other data type like jpg would be better. I like the menu bar on the top, but miss information about location and opening time at the front page.
- On the home page - all the posts on events and for example scrum and agile projects, repeats it self twice on the page - when you put your cursor over the youtube etc icons at the top, you could have a textbox saying youtube etc.
- Has good design, looks modern and interesting but I am not convinced of why I should go all the way to Villanova to see this.
- My first impression was that the website has a good design but maybe the main image is too big, since with my slow connection it took a while to load.

The news section is interesting, but I'm missing a 'opening time' for this museum on the main page since it's one of the main reasons I would enter a page like this.

The web design is really cool, specially the applications section with all the qr codes.
- Basic
- New, attractive, clear

12. What do you like the most and why?

Anzahl Teilnehmer: 4

- The navigation bar at the top, it is clearly structured and allows easy access to all content. The color scheme is nice, no blinding colors, well readable fonts.
- Pictures, amount of information.
- The news section and the applications section, because they are well designed, easy to read and with quality content. The information displayed would also be really interesting if I were a train passionate, but I'm not ;)
- Train Collection

13. What do you like the worst and why?

Anzahl Teilnehmer: 3

- That I can't find the location and opening times! That should be on the homepage. The bar with the phone number and email address is nice, but not necessary as contact is clearly listed in the menu bar.
- The map on contact site is first, you scroll on that first and not the page, it is ignoring.
- No opening hours on the main page visible.

The Welcome! In the main page, something else maybe is a better option!

14. Do you have any improving suggestions?

Anzahl Teilnehmer: 3

- Fix the image size and put the above mentioned information on the title page.
- No doubting on home site, but otherwise no.
- A bit slow for slow internet connections.