D.2.2 MyMATE Integrated Prototype for Validation and Refinement

Gamified Collaborative Platform for the Promotion of Sustainable Care and Independent Assisted Living

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Abstract	This deliverable describes the final architecture and functionalities of the MyMate system that will be subject to the validation phase.
Version	Version 1.0

HISTORY OF CHANGES

VERSION	DATE	SUMMARY OF CHANGES	AUTHOR
0.1	26/10/2017	First draft	BRA
0.2	15/11/2017	Second version	BRA
0.3	7/12/2017	Revised version	BRA

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EXECUTIVE SUMMARY

The report intends to describe the MyMate prototype version ready before the start of the validation phase. This version of the system will be subject to the use and testing of the end-users and will be refined accordingly with the feedback obtained from the users´ experiences.

The present document describes both the web-based dashboard and the mobile application architectures and the technologies employed for their development. In the subsequent sections, the report goes in detail through each part showing the alternatives the system can offer.

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1. INTRODUCTION

Once the functional specifications of MyMate platform had been clarified and agreed, it was the turn of developing the tool according to those requirements.

The present deliverable describes the technical aspects and the final design of both elements of the MyMate system. On the one hand, the web-based dashboard specifically addressed to the elderly care centres and on the other hand, the mobile application, specially designed for MyMate volunteers.

At this stage of the project, the Consortia has developed the first prototype of the technology that will refined thanks to the collaboration of end-users during the validation phase. The status of the prototype is fully operational, and ready to be tested in real conditions. Albeit, the developers expect that users can find potential bugs, these will be sorted out and improved as far as possible to achieve to offer a reliable and easy to use tool before the product release to market.

2. DASHBOARD APPLICATION

2.1 Architecture

The Dashboard or web application[1] has been designed to be used by the tertiary User, that is mainly, the user centres. These will be in charge of introducing all the necessary elements such as, rewards, medals, missions, etc. for the functioning of the application. The tertiary users will be authorised to carry out the following functions:

- Creation, modification and deletion of all necessary elements: Interest, Primary Users, Secondary Users, Activities, Questions, Reject Options, Medals, Rewards and Missions.
- Management of already existing missions, change to the next status, duplicate, reassign, finalise. See mission status diagram for further information.
- Chat with Secondary Users associated with a centre.
- Modification of the Tertiary User´s data and password.

2.2 Technologies employed

The following technologies/tools have been used to develop the application:

- MySQL
- Django / Python
- Django REST Framework

2.2.1 MySQL

Since the information needs to be stored in a permanent and accessible way from different platforms, we opted for the use of MySQL as a relational database manager.

2.2.2 Django/Python

The Django Framework has been used for the development of the Web/Backend part, using Python programming language. Django offers a fast and simple methodology in web application development, offering as well an MVC pattern that fits perfectly with the needs of the current project. It also integrates an ORM that facilitates the communication between the application and the Database Management System, providing flexibility, scalability and mapping of stored data.

2.2.3 Django REST Framework

Due to the heterogeneity of devices that will make use of the application such as, android, ios, web, etc. It is required to make a system of data access that needs to be transparent to the application, that means, that the way the data are obtained it is not connected with the final platform that will use them. That is why, the Django REST

Framework has been integrated into the system, which allows an agile creation of REST APIs in the application to obtain information stored in the database.

2.3 Dashboard functioning

The Dashboard is the core part of MyMate, it is responsible for the management of the application. Next, it is described how each section works:

2.3.1 Login

In order to access the web application, first of all, the user needs to log-in on the system. Thereby the privacy of the application and the stored data are ensured.

The app has a Role system, therefore, the creation of new roles must be notified to the app administrators.

From the different existing roles, only the administrator centre will be authorised to have Access to the web app.

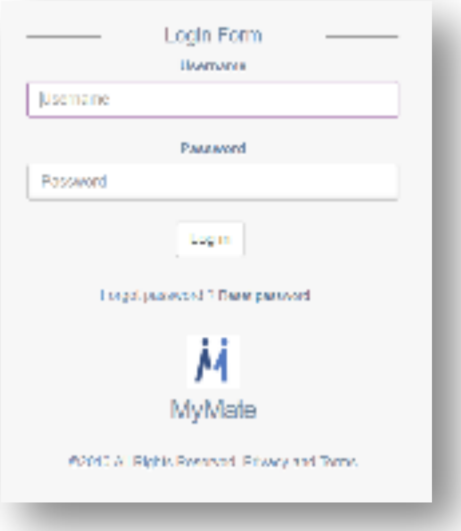

Login Form
Username
Username
Password
Password
Log in
Forgot password ? Reset password
MyMate
©2017 All Rights Reserved. Privacy and Terms.

Figure 1. Login message

2.3.2 Dashboard layout

Once logged-in, this is the design of the main homepage in which different sections can be noticed:

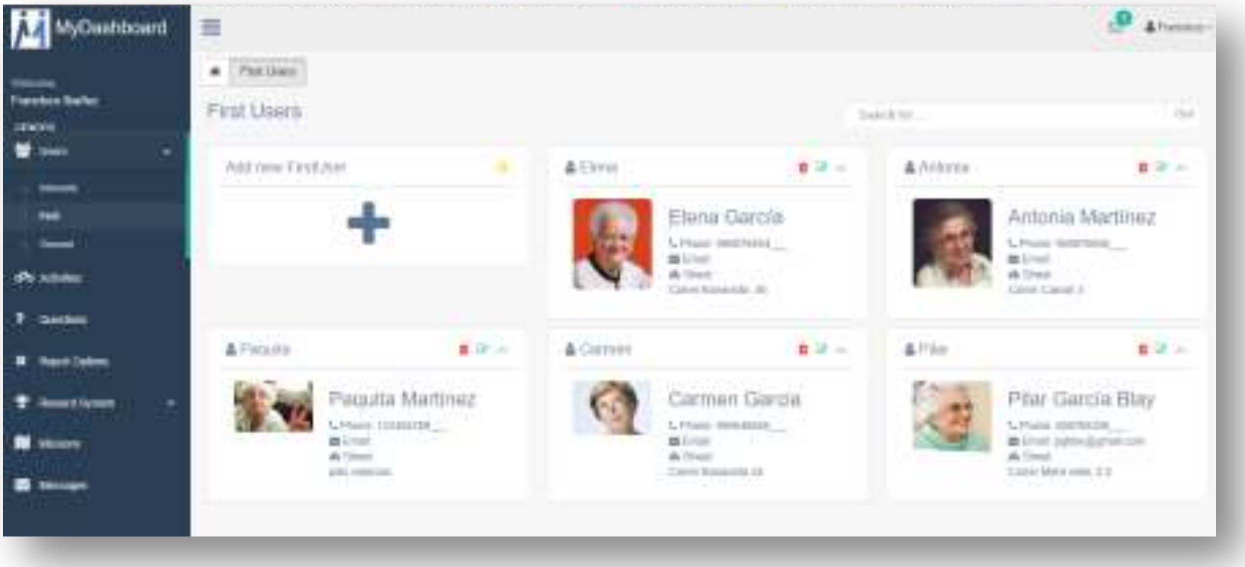


Figure 2. Dashboard homepage

A. At the top menu: information regarding new notifications and user configuration.
B. Lateral menu: access to the different functionalities.
C. Content: the content of each section is available in the centre of the screen.

2.3.3 Users

Within the User section, we can find three different options: Interests, Primary and Secondary. Those options are placed in the right order required to complete the data, that means, firstly, we will need to include the new interests so that later on, those can be associated with both primary and secondary users.

2.3.3.1 Interests

Any preference/requisite that may be used for the users matching needs to be included within this category. The editing and configuration are carried out in the following screen:

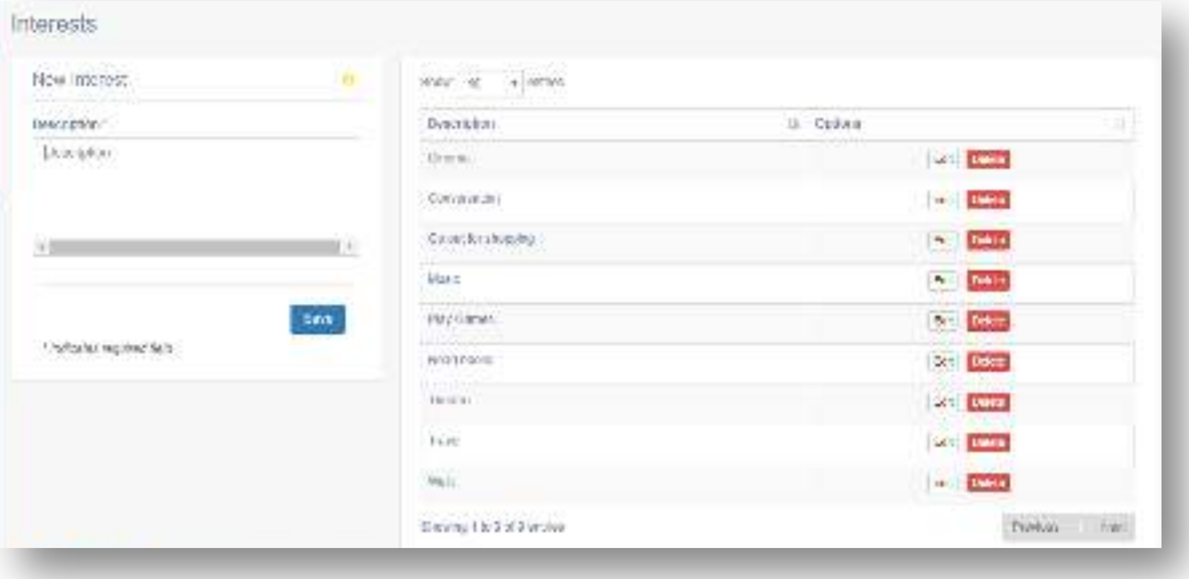
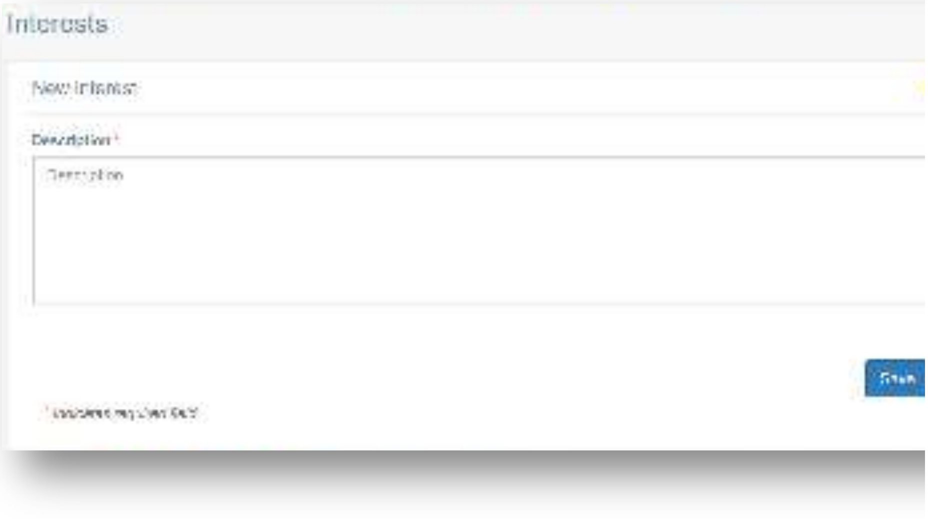


Figure 3. Interests section

The form on the left is used for the creation and editing of an interest. To edit an interest, the user must click on Edit button from the list on the right, once edited, the information will be uploaded on the form. To save either new interests or any change made over an interest, it must click on Save. Likewise, o discard changes, it only takes to click on Cancel.



Interests

New interest

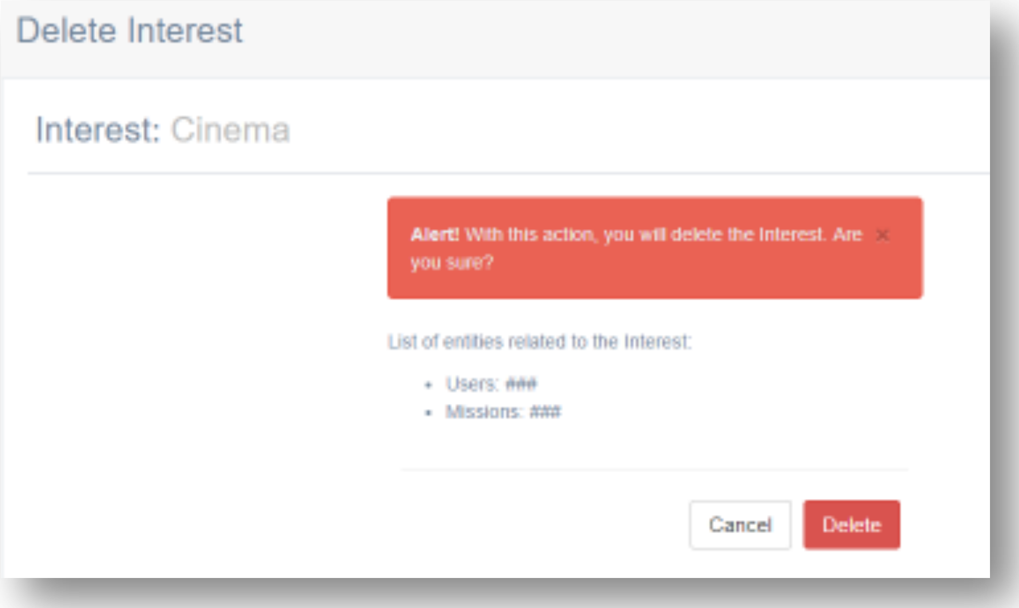
Description *

Description

* Indicates required field

Figure 4. New interest creation form

Finally, the button Delete is addressed to delete an interest. Before that, the app will ask to confirm the action.



Delete Interest

Interest: Cinema

Alert! With this action, you will delete the Interest. Are you sure?

List of entities related to the Interest:

- Users: ###
- Missions: ###

Figure 5. Delete interest confirmation message

2.3.3.2 Primary and Secondary

Within the Primary and Secondary labels, we find the same layout with a list of the users of the system:

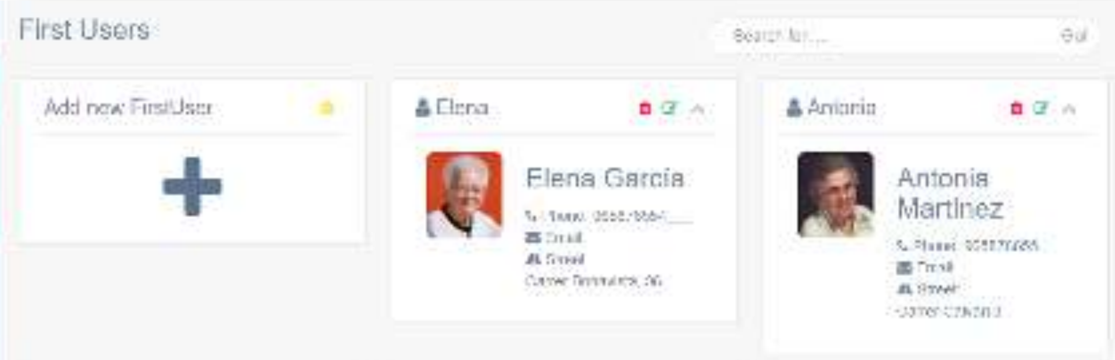


Figure 6. First users section layout

*Note: the image above belongs to the Primary users albeit for the Secondary will be the same, but only changing the content.

To create a new user click on the icon (+) within the option "Add a new Primary User", for the Secondary users will be the same case as it is shown in the image below:

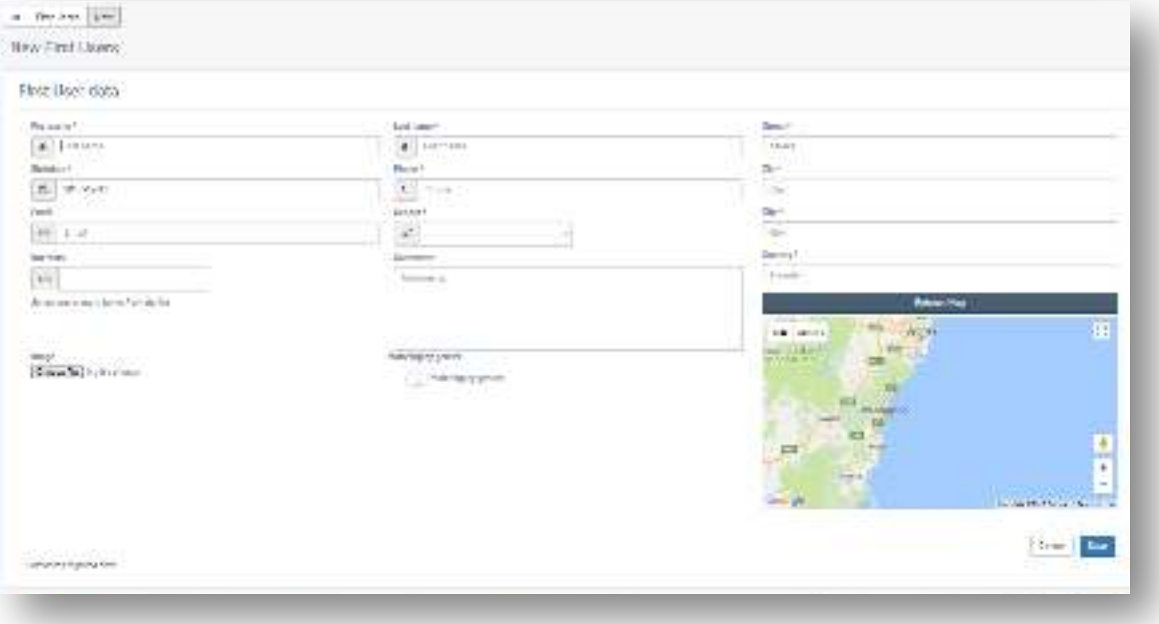
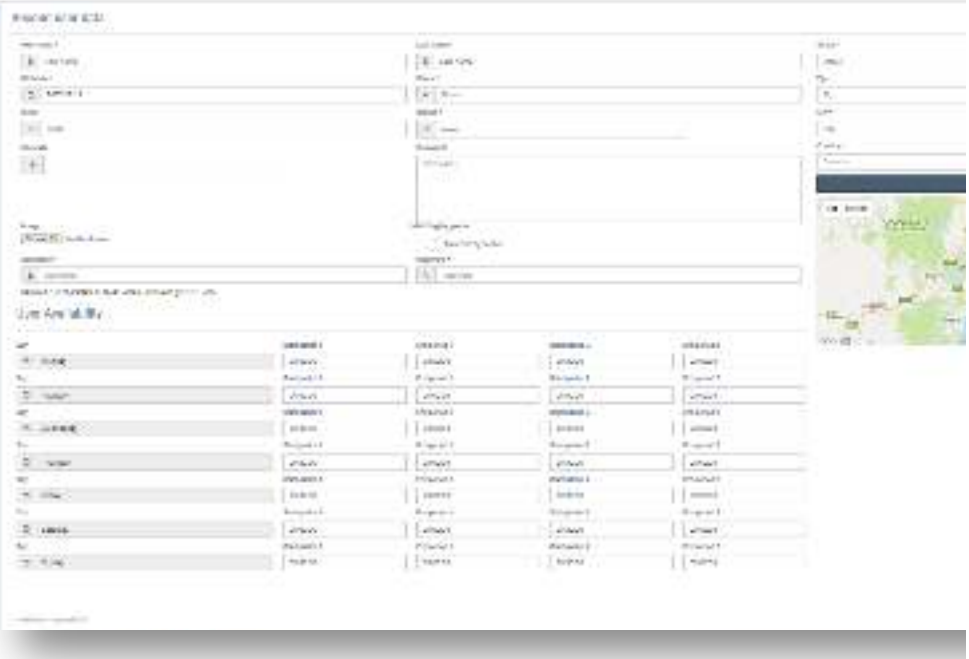


Figure 7. New first user creation form

The only difference between the creation of a Primary or Secondary user is that the latter is required to enter a password due to the fact that, this user will be in charge of making use of the application and availability as shown below.



User Availability

Figure 8. New second user creation form

To proceed to delete a user, it just needs to click on the delete button that is placed in the main list and depicted by a "waste bin" (see Figure 9), whereas, in the user edition screen the action is done by means of a Delete button as shown in Figure 10.

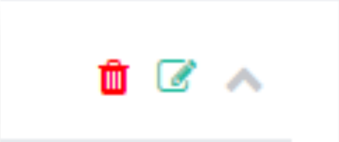
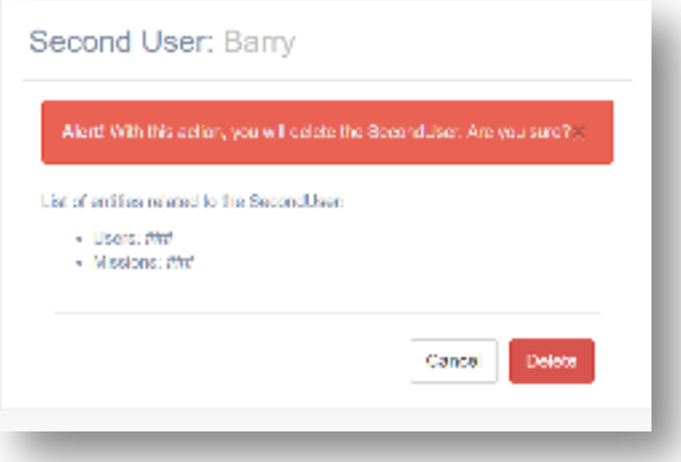


Figure 9. Delete icon



Second User: Barry

Alert! With this action, you will delete the SecondUser. Are you sure? ×

List of entities related to the SecondUser:

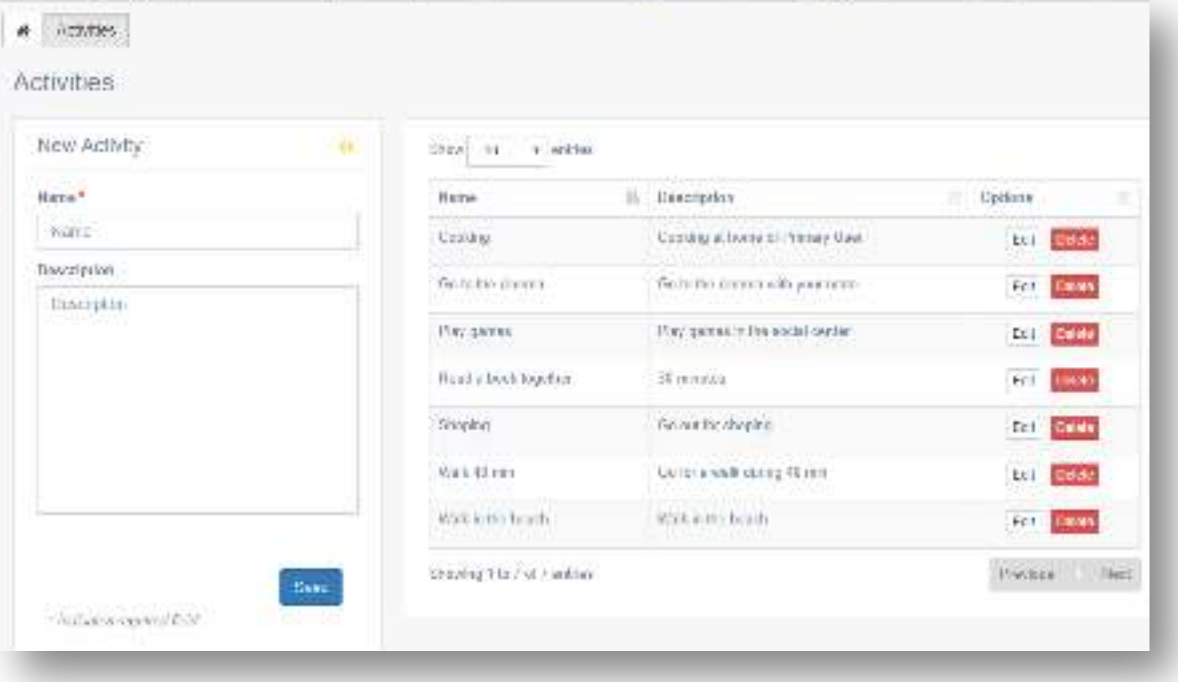
- Users: ffff
- Missions: ffff

Figure 10. Delete warning message

2.3.4 *Activities*

Activities, in this case, mean actions to be carried out during the course of a mission, it is important to maintain the order of creation of the elements in the application. As indicated in point 2.2.3 Users, it was necessary to create first of all interests, and then assign them to users. On this occasion, activities must be created beforehand and then assigned to the missions.

Again, a very similar structure to the one shown in the Interests section is presented:



Activities

New Activity

Name *

Name

Description

Description

Show 10 entries

Name	Description	Options
Cooking	Cooking at home of Primary User	Edit Delete
Go to the church	Go to the church with your mate	Edit Delete
Play games	Play games in the social center	Edit Delete
Read a book together	30 minutes	Edit Delete
Shopping	Go out for shopping	Edit Delete
Walk 40 min	Go for a walk during 40 min	Edit Delete
Walk in the beach	Walk in the beach	Edit Delete

Showing 1 to 7 of 7 entries

Figure 11. Activities creation form

As in the previous cases, the "save, edit and delete" buttons will be used to perform actions on the elements.

2.3.5 *Reporting questions*

When a Secondary User completes a mission, a form is submitted with a set of pre-set questions and answers for each mission, this set of questions/answers is managed from this section. These elements can be published or not depending if the “active” option is selected or not in the system, that is to say, by means of the "active" option we can modify if this element will appear in the list of questions when creating a mission.

As it can be noticed, the form follows the same layout of previous forms as shown in the screenshot below:

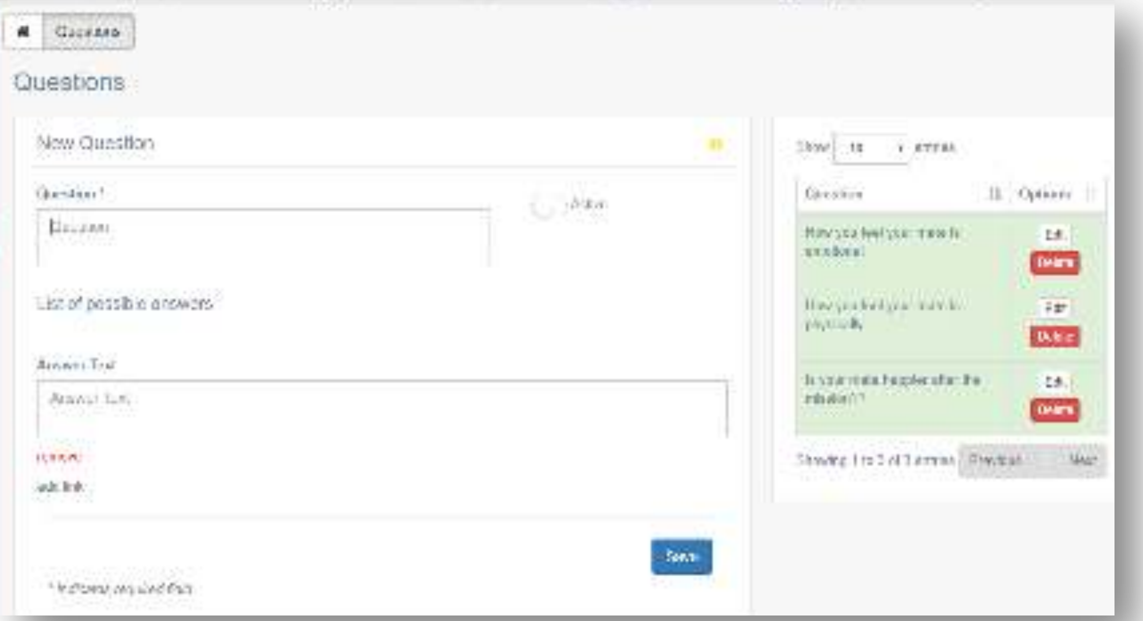
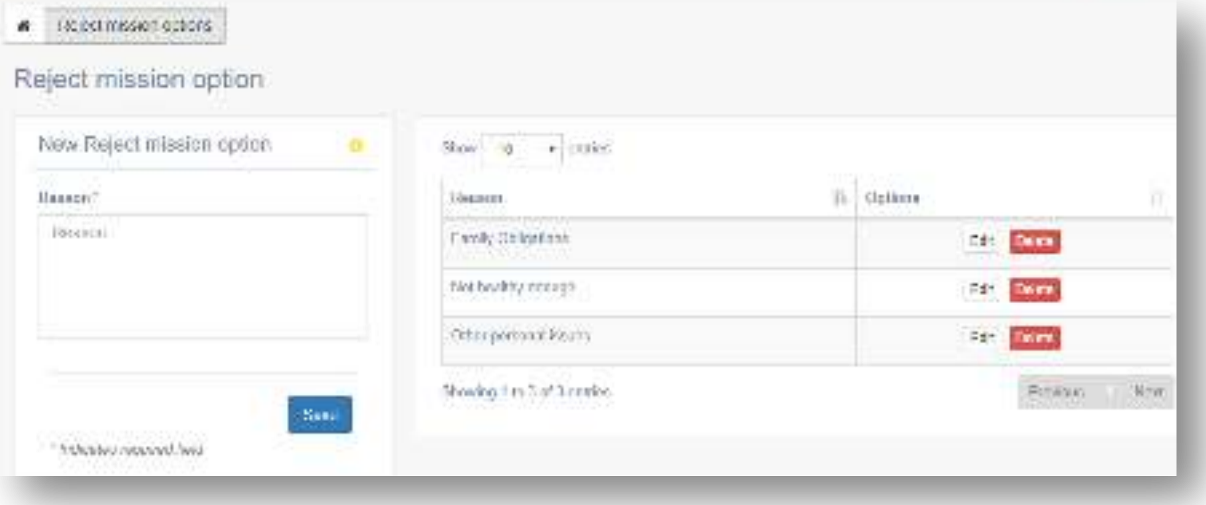


Figure 12. Reporting questions form

2.3.6 Rejection options

Rejection options are displayed only to *Secondary Users* on their mobile application in the case they wish to reject a mission. Rejection options are set by each user centre. It must be said that all the missions set by a user centre will have the same rejection options.



Reason	Options
Family Obligations	Edit Delete
Not healthy enough	Edit Delete
Other personal Reasons	Edit Delete

Showing 1 to 3 of 3 entries

Figure 13. Reject missions form

2.3.7 Reward System

In the rewards section, we find two categories: Medals and Rewards. The order of creation of the elements is important, since if there are no medals created, it won´t be possible to assign a reward prize for each medal. Therefore, it is advisable to create in first place the medals and then, create the rewards. It is important to highlight that the modification of a medal does not imply having to modify the reward again.

Medals

The medals on MyMate serve to classify users. A user will win a medal when reaching the corresponding points determined for each medal. Each new *Secondary User* is assigned with the Zero medal to start with.

MyMate is configured by default with five types of medals that will be exclusive for each centre, these are created automatically and can be edited and deleted. However, a maximum of 5 medals can be created per user centre. The medals and their scoring created by default, are as follows:

Medal	Points
Platinum	2.500
Gold	1.200
Silver	900
Bronze	300
Zero	0

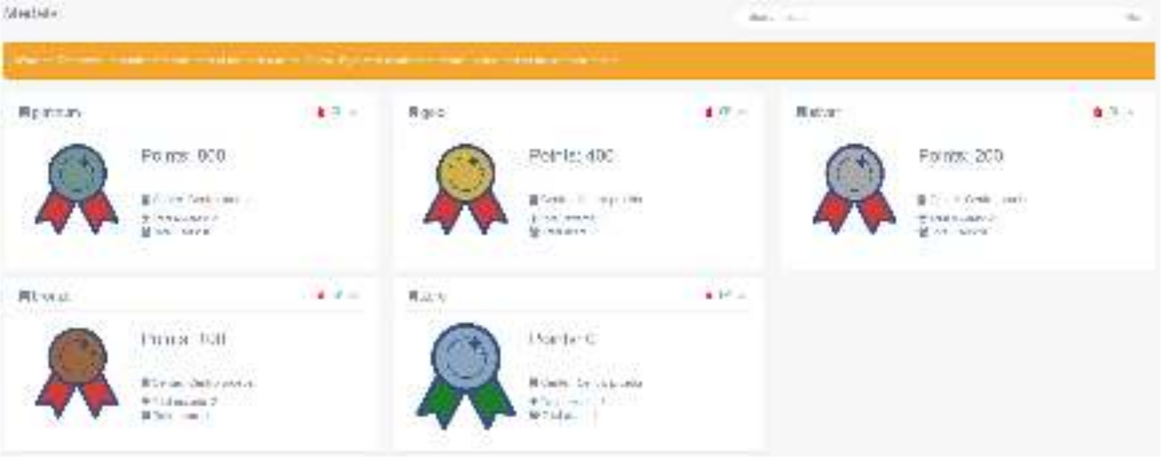
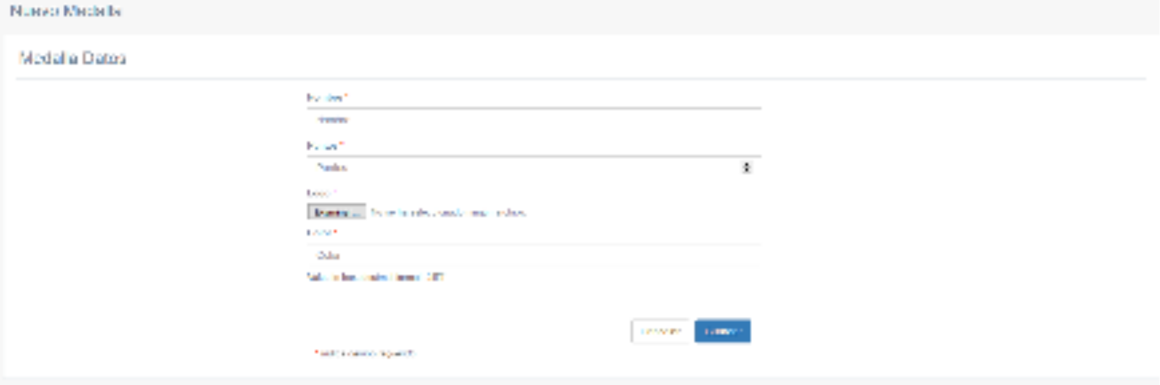


Figure 14. Medals list layout

To edit a medal, the user must click on the icon. Next, the following form will be displayed:

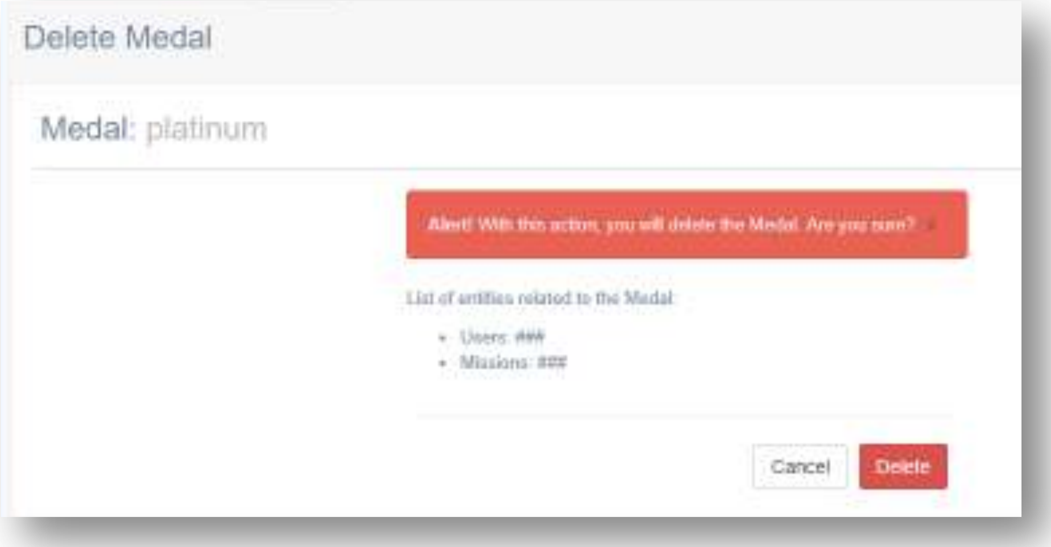


Nueva Medalla

Medalla Datos

Figure 15. New medal creation form

To create new medals, first of all, at least one of the medals created by default must be deleted, then the system will ask for confirmation as shown in the image:



Delete Medal

Medal: platinum

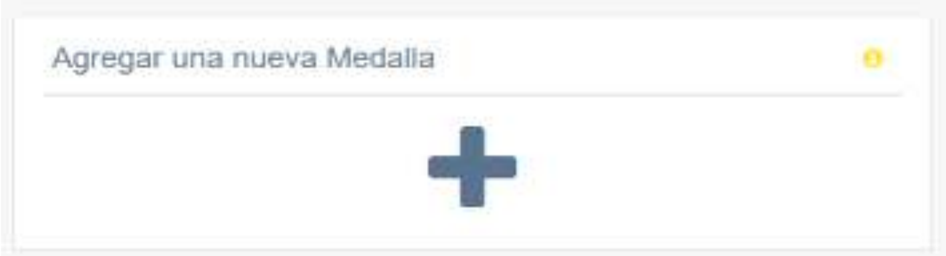
Alert! With this action, you will delete the Medal. Are you sure?

List of entities related to the Medal:

- Users: ###
- Missions: ###

Figure 16. Delete medal warning message

Once, one or more medals have been deleted, the system will show the following message in order to be able to create new ones.



Agregar una nueva Medalla

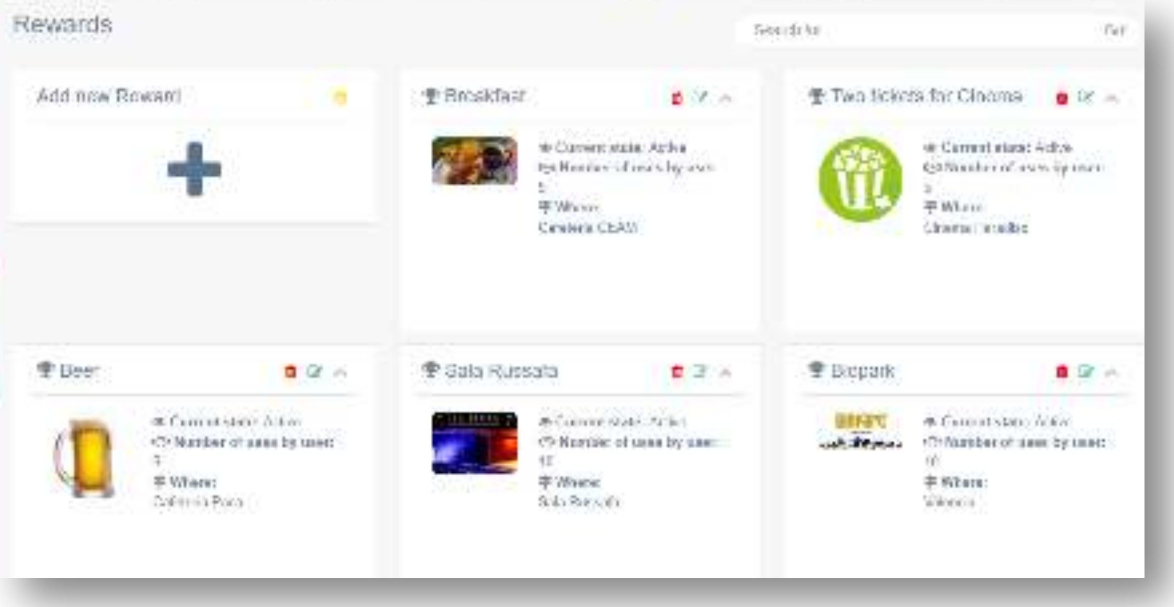
Figure 16. New medal creation icon

**Note:* *The form used for the creation and edition of medals is the same, being the only difference the presentation of the previous data in the case of the edition form.*

Rewards

MyMate proposes a system of Rewards with the aim of engaging *Secondary Users* to carry out missions. Every time a *Secondary User* completes a mission, he will be rewarded with the points allotted for that specific mission. These points can be redeemed by Rewards or donated (this configuration is done from the mobile application).

When accessing the Rewards section, the user will find a list (of cards type) with the existing Rewards so far.



Rewards

Add new Reward

Breakfast

Current state: Active
Number of uses by user:
5
Where:
Cafeteria CEAM

Two tickets for Cinema

Current state: Active
Number of uses by user:
[illegible]
Where:
Cinema [illegible]

Beer

Current state: Active
Number of uses by user:
[illegible]
Where:
Cafeteria Paco

Sala Russafa

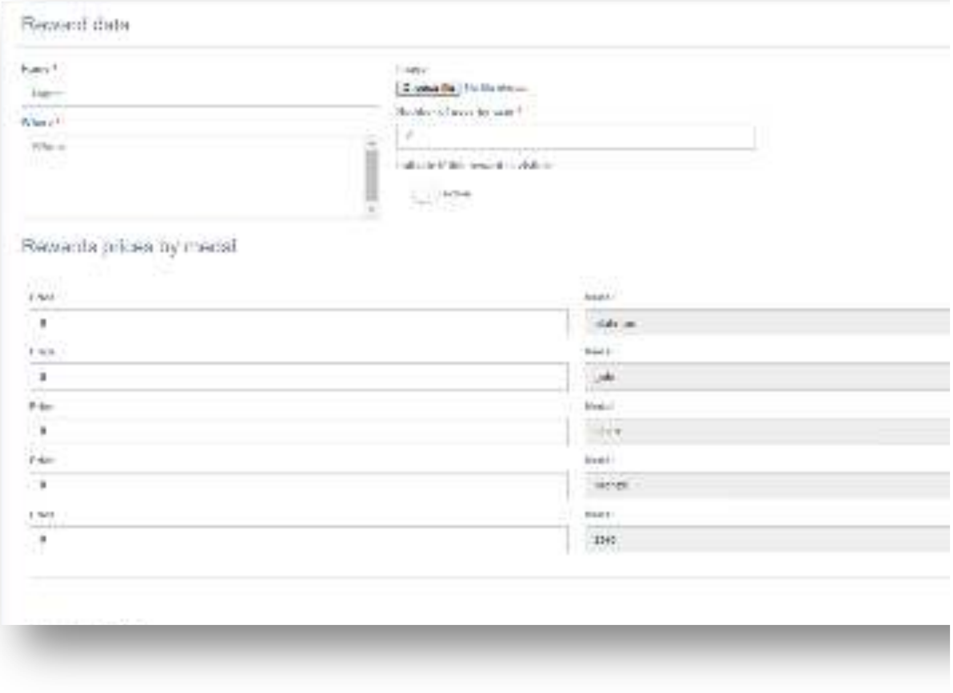
Current state: Active
Number of uses by user:
[illegible]
Where:
Sala Russafa

Bioparc

Current state: Active
Number of uses by user:
[illegible]
Where:
Valencia

Figure 17. Rewards list layout

Both for the creation and edition of new Rewards, the system will demand the price of the *Reward* per medal. We can also indicate whether we want the Reward to be visible in the system.



Reward data

Rewards prices by medal

Figure 18. Reward data form

To remove a Reward, proceed as in the previous cases, confirming the system's willingness to delete it.

2.4 Missions

Missions constitute the main core of the application, consisting on those activities that the *secondary users* will perform together with the *primary user*. Each mission will be assigned to the same centre where it has been created, only the users of that centre can be assigned to that mission.

Every mission has a set of status according to its degree of progress. The different possible status are depicted in the following diagram:

In the diagram you can see all the status and transitions that a mission can have, along with the user role that can perform this action.

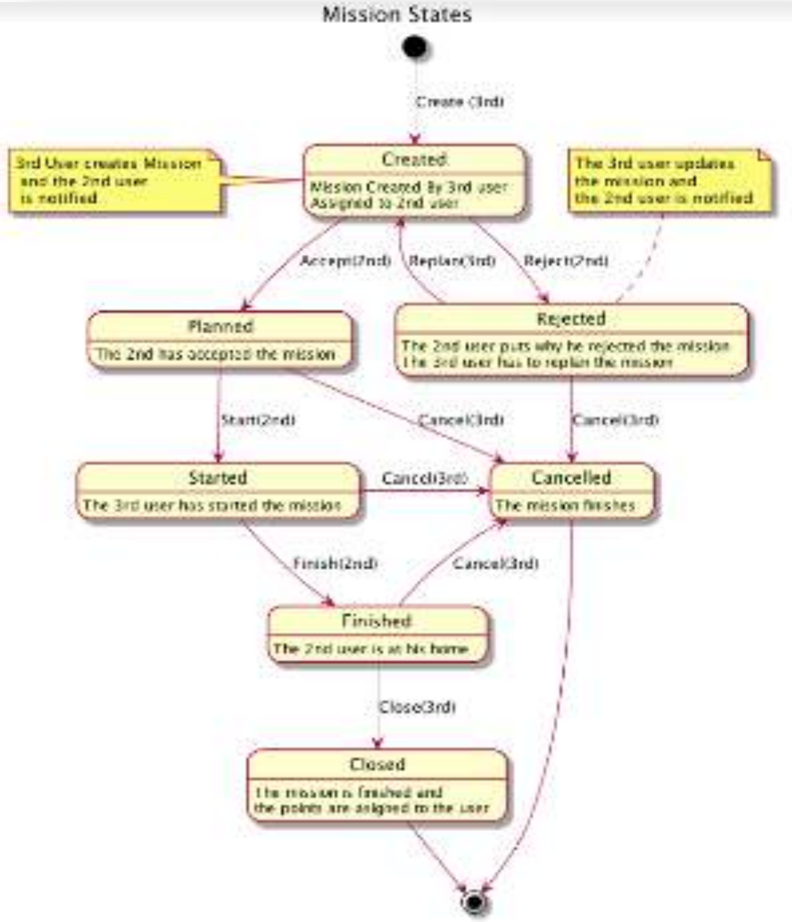


Figure 19. Mission´s Workflow

Within the Dashboard, in order to create a new mission, you must access the "Mission" menu where the already existing missions are listed:

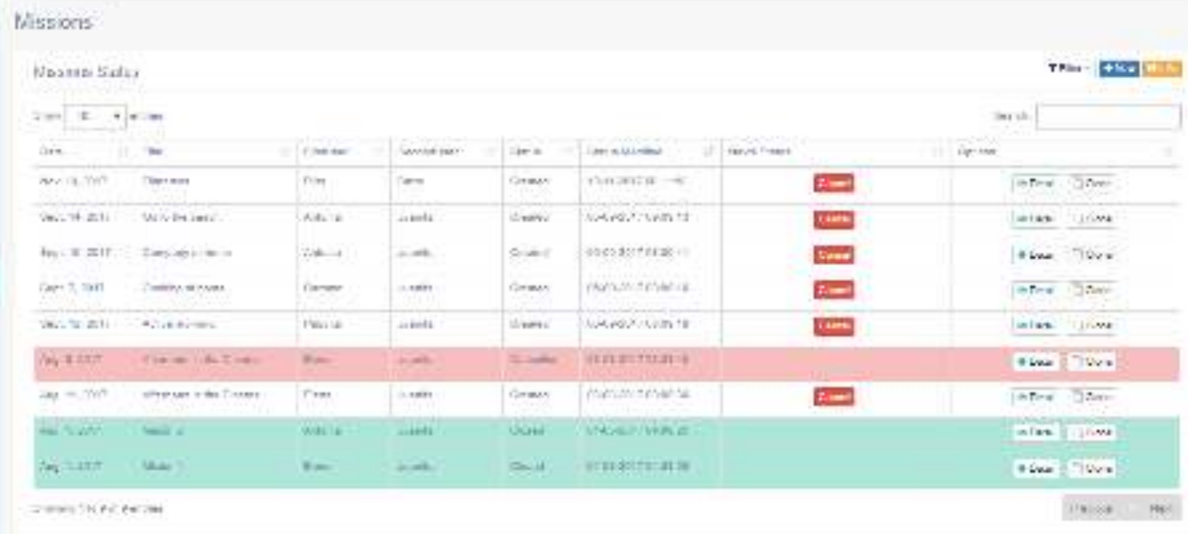


Figure 20. Missions menu

In the top menu, there are 3 different buttons addressed to:

- **Filter**: filters the missions according to their status.
- **New**: adds a new mission.
- **Info**: shows a pop-up message with the different status icons and their meaning.

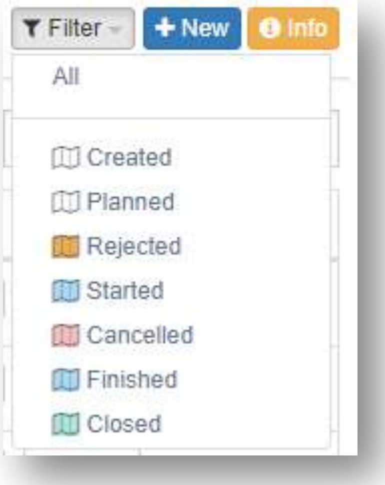


Figure 21. Menu options

For every mission shown in the table, we can execute the following actions:

- **Clone**: this option allows creating a new mission by duplicating the data from another mission. (Image: Mission form)
- **Detail**: it shows the detail with all mission data, statuses, activities and user replies.
- **Next Status**: Depending on the current status of the mission, you can switch to the next status or return to previous ones according to the workflow shown in the diagram above. Every time a status change happens, the system will display a confirmation message.

Mission form

When creating or editing a mission, a form with four steps is displayed to be completed:

- General Data.
- Users Data.
- Mission Address.
- Confirmation.

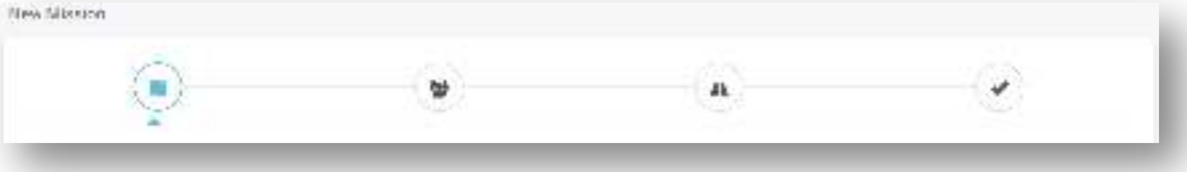
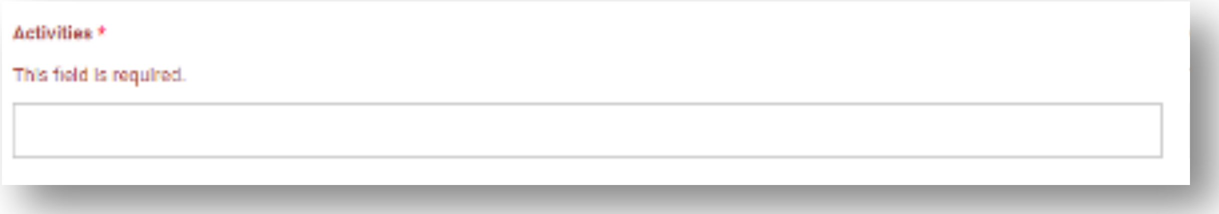


Figure 22. New mission form

The system doesn´t allow doing one step at a time unless it has been completed correctly. If the form is incorrect, the system will show red boxes where the errors have been found:



Activities *

This field is required.

Figure 23. Mission creation form

This is the general look of the mission form:

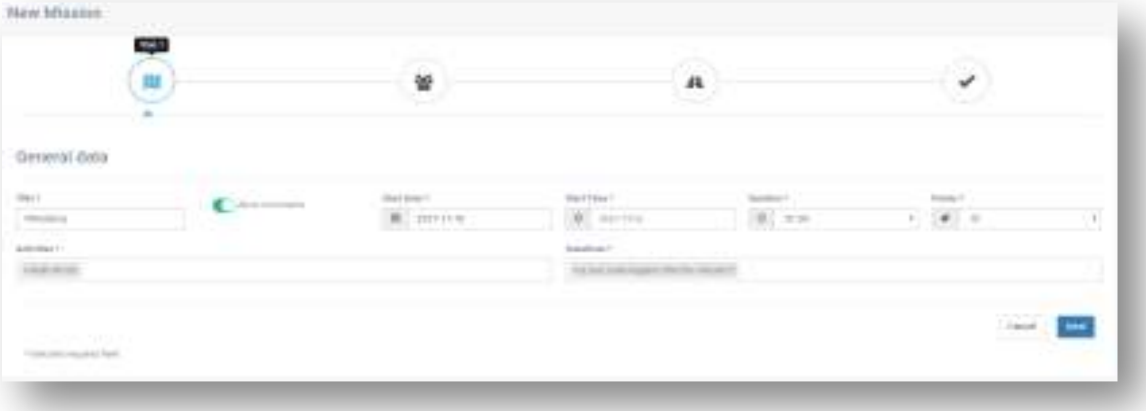


Figure 24. New mission form

3. MOBILE APPLICATION – MYMATE APP

3.1 Architecture

The mobile application is designed to be used by the secondary user the ability to do interact with the centre software remotely in an informal gamified way. The functionalities included in this mobile application are the following:

- Review the new available activities that can be done (called Missions in its gamified equivalent) created by the centre through the dashboard application.
- Interact with the different activities (Missions), allowing the secondary user to accept or reject them.
- Report an activity result through a little questionnaire that has been previously prepared by the centre through the dashboard application.
- The secondary user is able to review his own profile, including the points obtained by completing the assigned activities, he or she will also be able to edit his own user profile and to modify his or her availability schedule.
- The user will be able to review the rewards obtained by finishing the missions, and will also see the new improvements and advantages that he or she will get through achieving more points.
- Chat and interact with other secondary users if the centre has enabled that feature.
- Chat and interact with the centre user.
- Receive Push Notifications about new planned activities (missions) or new received chat messages.

All these features are embedded in the mobile application and can be easily accessed thanks to a friendly user interface with a menu made of big icon buttons that group the previous named features in six different sections that will be referred in the following pages. These sections are a) user authentication, b) home and main menu, c) the activities section, d) secondary user profile, e) messaging section, f) rewards section and g) help and contact section. All the sections can be seen in the attached use case diagram, some of them are composed of several views or subsections that will be described later.

Attached is the use case diagram of the different sections and features provided by the mobile application:

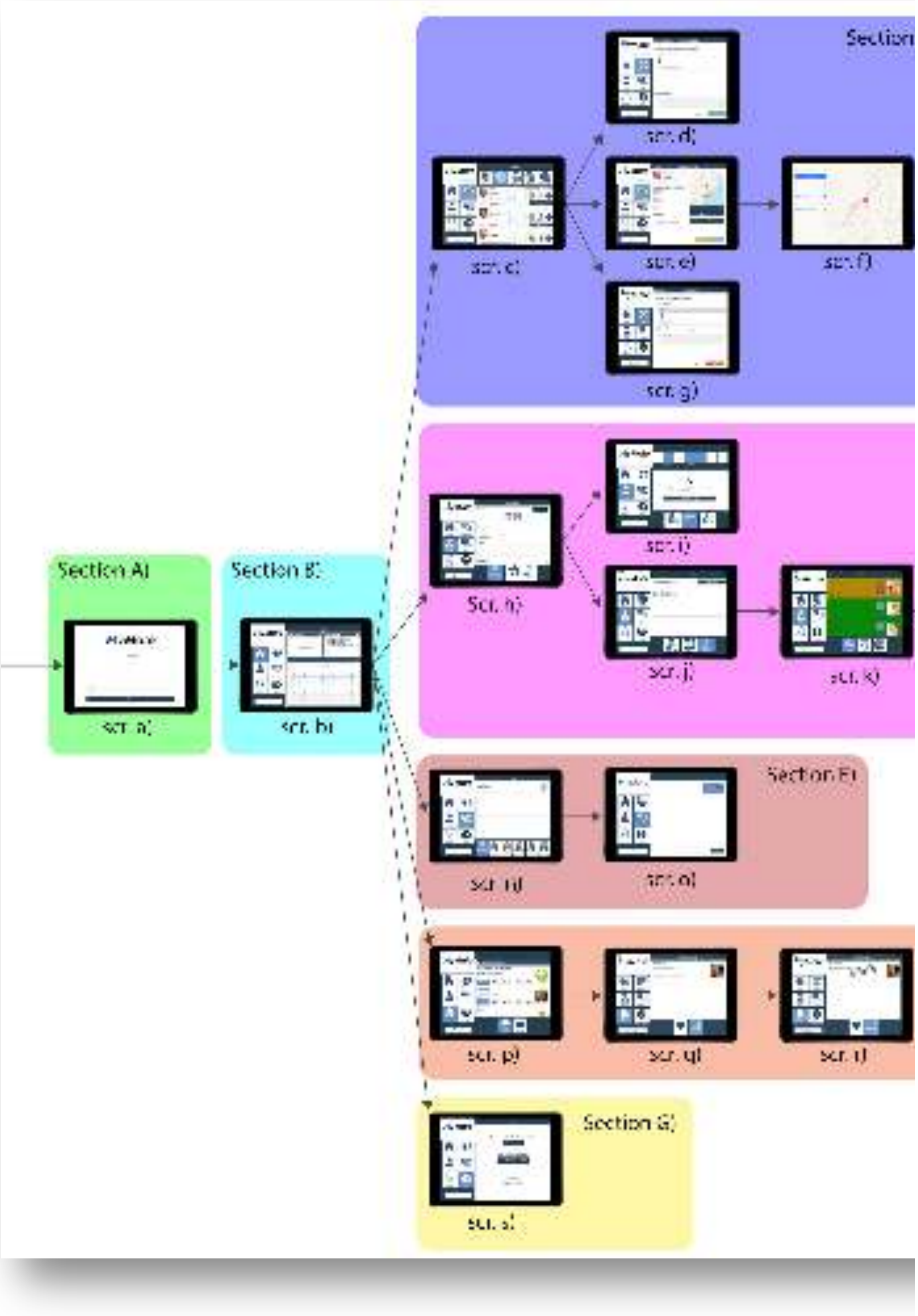


Figure 25. My Mate Mobile App Use Case diagram

Now we describe the different views or windows contained in the mobile application that from now on we will call pages for technical reasons. The user interaction with each of them and the API data transmission derived from the interaction will be treated in the corresponding sections: 3.3 Interactions and 3.4 API

Section A) Secondary user authentication

Scr. a) Login page

Section B) Home and main menu section

- Scr. b) Summary and calendar page

Section C) Mission section

- Scr. c) mission inbox and status page
- Scr. d) finish mission report questionnaire page
- Scr. e) mission detail page
- Scr. f) Map and get directions page
- Scr. g) reject mission options page

Section D) Secondary user profile section

- Scr. h) secondary user personal information edit page
- Scr. i) calendar of availability page
- Scr. j) score and level review page
- Scr. k) global secondary user ranking page
- Scr. l) weekly secondary user ranking page
- Scr. m) monthly secondary user ranking page

Section E) Messaging section

- Scr. n) user selection for messaging page
- Scr. o) chat with one user page

Section F) Rewards section

- Scr. p) available reward catalogue list page
- Scr. q) exchanged reward list page
- Scr. r) acquired reward list page

Section G) Help section

- Scr. s) Contact and help page

3.2 Technologies

Initial development tests were implemented using the «Eclipse» IDE for
Android devices, but finally we decided to use the new Microsoft Xamarin technology, that allowed us to generate the final application for the two main mobile architectures available in the mass market, iOS and Android. For that reason, we started the development of our App with «Microsoft's Visual Studio for Mac» IDE, and we installed all necessary components for our target operating systems, Google's Android SDK and Apple's and iOS SDK, followed by Apple's Xcode IDE, needed for iOS build compilations. The development language used for the development has been the C# language, specifically, a subset of it called ".NET Core" that contains all necessary frameworks and APIs for to get the most out of hybrid Android and iOS development.

So, with Xamarin, it is possible to develop in the two main platforms of the market (iOS and Android), sharing up to 90% of the code. This implies a considerable saving in time and resources, since it allows us to develop in all two platforms at once and, if we find an error, the correction will be applied in both platforms when compiling it again.

Xamarin also provides a native user interface, granting access to all mobile hardware. With Xamarin we obtain 100% native applications, just as if they had been encoded in Objective-C, Swift or Java. In short, Xamarin assures us a very good user experience, vital in any app. Xamarin apps leverage platform-specific hardware acceleration, and are compiled for native performance. This can't be achieved with solutions that interpret code at runtime.

The native platforms are constantly evolving and suffer continuous updates. Xamarin has as many third-party libraries as the native code itself. Therefore, it eliminates all the limitations that we could have regarding updates of the native operating system.

The mobile application has been developed following an internationalized and localized approach, and Xamarin was a great technology to achieve that in a friendly and transparent way. We have used Xamarin's Internationalization functionality for making our code able of displaying several languages and selectively displaying them for different locales (such as number and date formatting), this is also called globalization. And then we implemented a second part, called Localization for the next step – that consisted on preparing different resources (such as texts and images) for each language and embedding them in the multi-language application.

We have implemented the internationalization functionality through the built-in framework for locating .NET apps that uses RESX extension files and the provided libraries System.Resources and System.Globalization. We have provided a RESX file containing translated strings and we have included them in the Xamarin application assembly, along with an auto-generated class that provides automatic detection of the user's local language of his or her device and accesses to the correct translations.

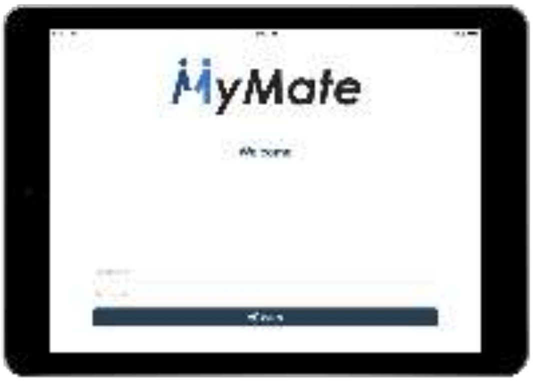
Finally, we have to mention that in order to communicate with the server database, the interaction has been implemented using a REST web service that transfers the data to the server. The users, missions, rewards and other elements, called objects for technical reasons, are mapped in a JSON message. JSON (JavaScript Object Notation acronym) is an open standard based on text designed for human-readable data exchange. It derives from the JavaScript scripting language, to represent simple data structures and associative lists, the so-called objects. In spite of its relation with the JavaScript, it has implementations for great part of the languages of programming.

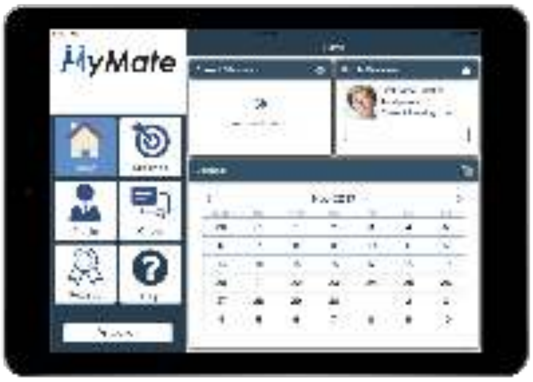
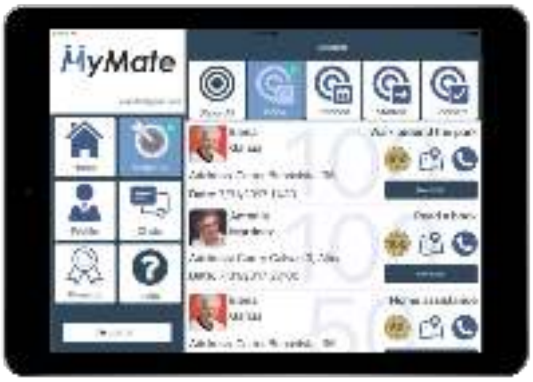
The JSON format is commonly used to serialize and transmit structured data to a network connection. It is mainly used to exchange data between a server and a web application, being an alternative to XML.

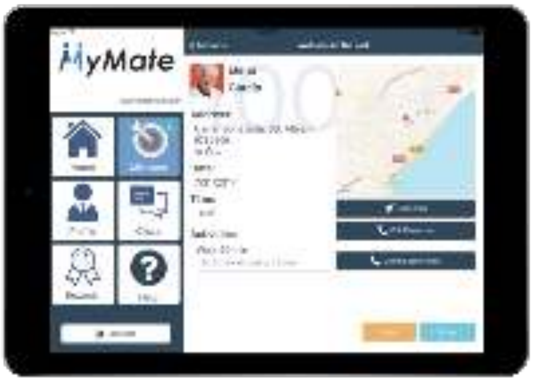
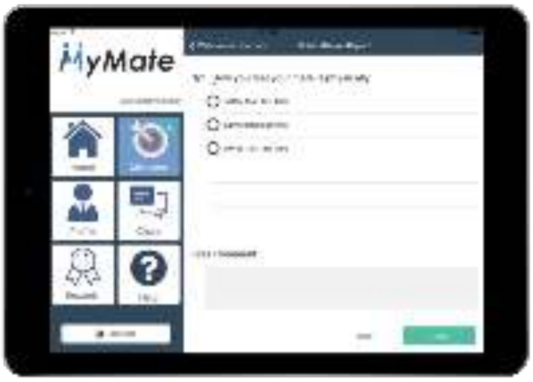
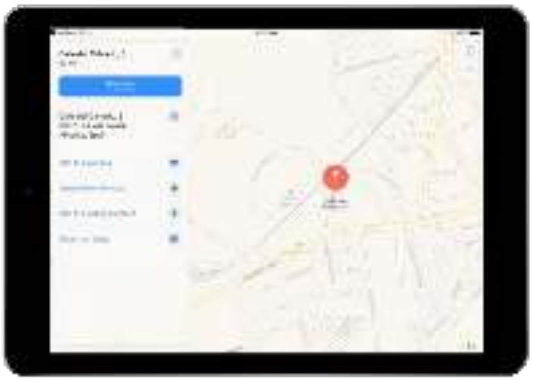
3.3 Interactions

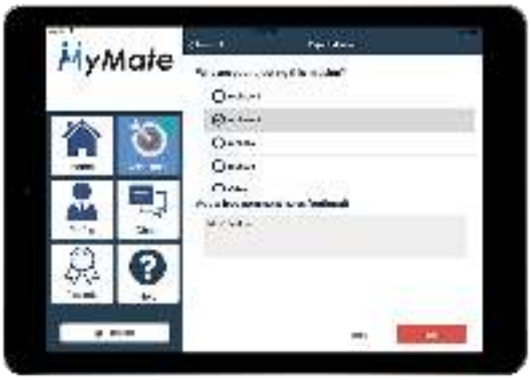
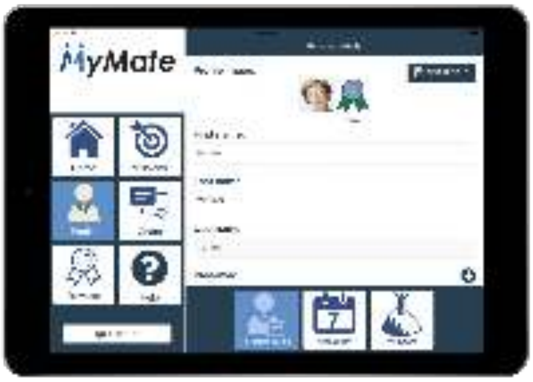
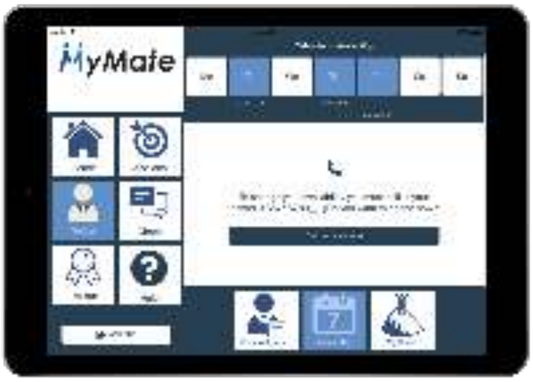
The mobile application is planned to be installed on mobile devices and tablets that can be either iOS or Android based. Of course, the hardware must include a network connection allowing the application to communicate with the server software, which is responsible for connecting to the database. The interaction is done through a REST web service that transfers all data petitions over a secure HTTPS connection. All the data petitions will be explained in the next section 3.4 APIs.

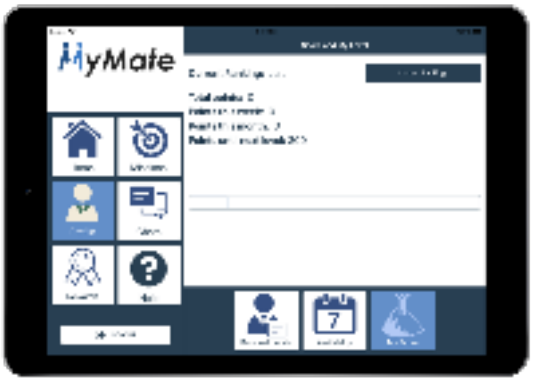
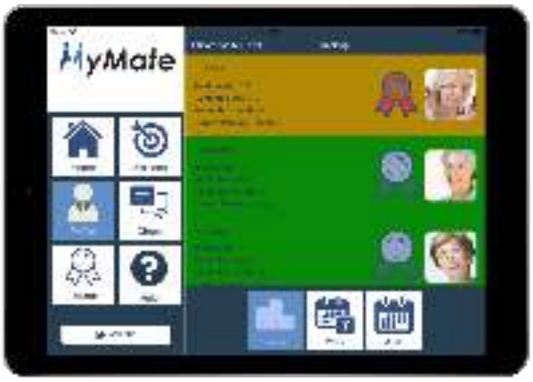
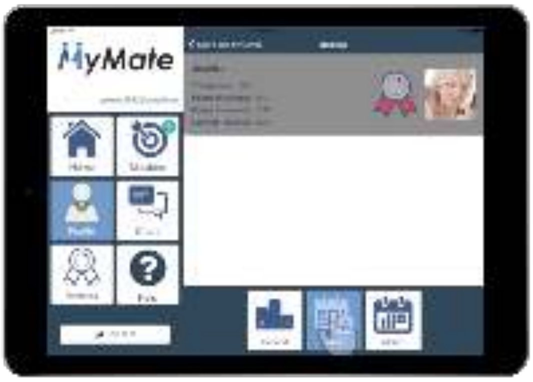
User interactions with the application are explained now ordered by pages:

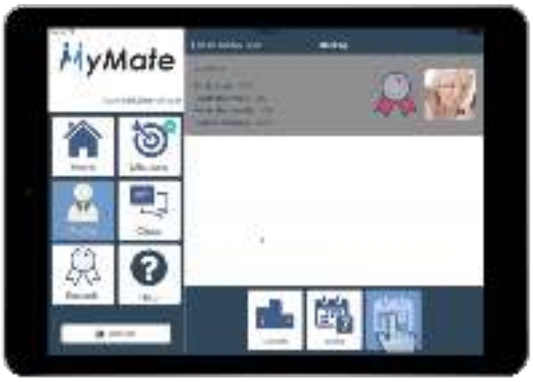
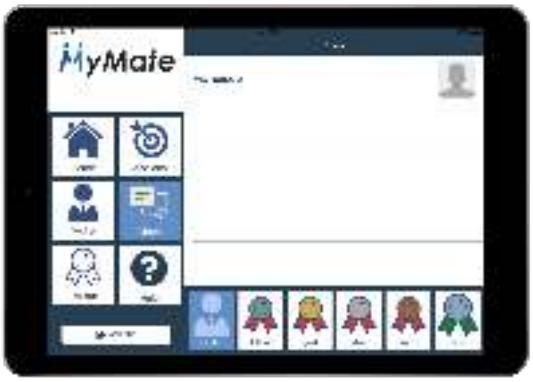
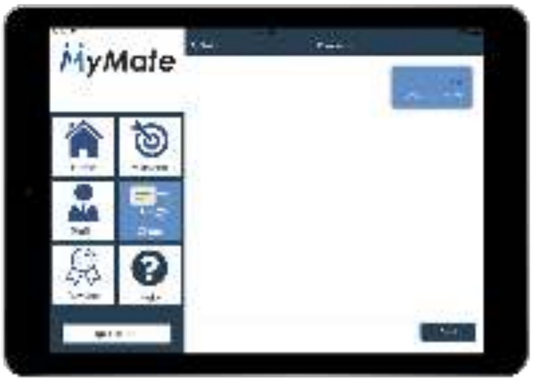
<table>
<tr><th colspan="2">SECTION A) Secondary user authentication</th></tr>
<tr><td>
Scr. a) Login page</td><td>This page is the entry point for the mobile application. This is the first view that the secondary user will see.
In order to get access to the mobile application the secondary user has to enter a username and password that were previously provided by the centre.
Then when the user touches the login button a login request API is called.</td></tr>
<tr><th colspan="2">SECTION B) Home and main menu section</th></tr>
</table>

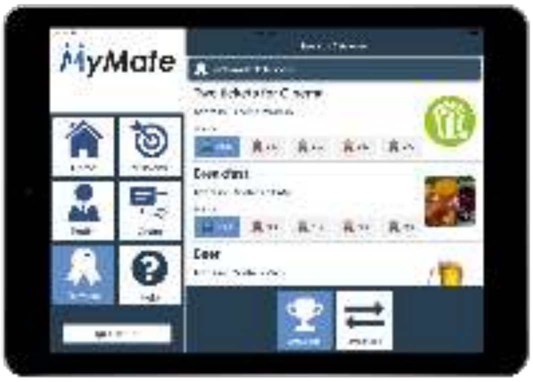
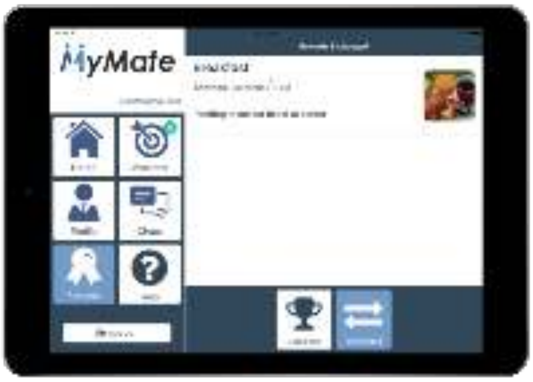
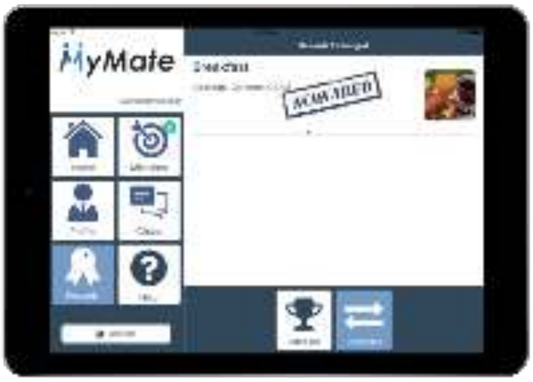
 Scr. b) Summary and calendar page	The home page is divided in four sections. The section on the left is the main menu and will always be visible in order to help the navigation. The missions and chat buttons show a small badge over them to indicate that new missions or messages are available. Then, the section on the right, has a summary view of a mission, if it has already started. We have another summary view of the user profile, including his or her image, username, current ranking and total points. We also have a last section that includes a calendar view of all the upcoming missions that will highlight the proper days. The user can also check a detailed view of the mission touching a highlighted date.
SECTION C) Missions section	
 Scr. c) mission inbox and status page	In this page, the secondary user will see all the available activities. The page is divided in five tabs. in order to group the different missions depending on their status (inbox, planned, started or finished). In each row of the mission list the user can see a summary of the activity as well as the primary user data and how many points will obtain if he or she finishes the mission. Finally, there is a button that can be pressed in order to see the detailed information for the selected mission.

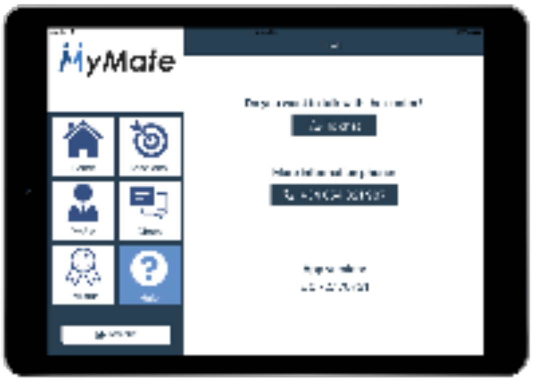
 Scr. e) mission detail page	This page, shows a more detailed view of a previous selected activity or mission. The page is divided in five tabs. in order to group the different missions depending on their status (inbox, planned, started or finished). This page is also where the secondary user will be able to accept, reject, start, or finish the missions. This will be done through a group of buttons in the bottom right corner with a friendly color codification.
 Scr. d) finish mission report questionnaire page	Once the secondary user has finished a mission, he or she opens the app and touches the 'finish mission' button, so this page will be displayed. A small test questionnaire will be prompted to the user. The displayed questions can be customized by the centre through the dashboard application. At the end of the questionnaire an open text box is shown in case the secondary user wants to write a free comment.
 Scr. f) map and get directions page	In this page, the secondary user will see a full screen map with a pin on the mission address and the mobile application will use the native map capabilities in order to show directions to get to the mission address.

 Scr. g) reject mission page	This page is where the secondary user can reject a mission. A set of possible reasons is pre-established by the centre user in the dashboard application. There is also an optional free comment box where the secondary user can detail why he or she is rejecting the mission assigned to him or her.
SECTION D) Secondary user profile section	
 Scr. h) secondary user personal information edit page	The secondary user can access his or her personal data profile through this page. He or she will be able to check or edit the personal data, such as address, email and the app password. The current level of the gamified app is also displayed here. From this page, it will be possible to access other two subpages in this section through a tab menu placed at the bottom. One to check the user's weekly availability, and another page that contains the detailed score.
 Scr. i) calendar of availability page	This is the calendar of availability page. At the top part of the page is where the user can check his or her current availability for placing missions. The days set for placing missions will be highlighted, and under its icon the user will see the available hours. In case the user wants to change his or her availability, a phone shortcut button is available.

 Scr. j) score and level review page	In this page, the secondary user will be able to see his or her current ranking level, and also a summary of the total points obtained since he or she started using the mobile application. There is also a weekly and monthly score total shown in order to see more recent activity. Finally, a progress bar is shown to encourage the user to obtain more points in order to reach the next level.
 Scr. k) global secondary user ranking	This is the global ranking page. This page will be available if the centre has decided to enable it. This is where secondary users can compare their score with other secondary users. This is a great way to encourage themselves to keep obtaining points. A color code is used here to highlight the different levels reached by the users.
 Scr. l) weekly secondary user ranking	This is the weekly ranking page. This page will be available if the centre has decided to enable the ranking option for their users. In this ranking will only appear the points obtained during the current week. A color code is used here to highlight the different levels reached by the users.

<table>
<tr><td>
Scr. m) monthly secondary user ranking</td><td>This is the monthly ranking page. This is the third option available inside the secondary user score and level section. As the two previous pages, this page will only be available if the centre has decided to enable the ranking option for their users. In this ranking will only appear the points obtained during the current month.
A color code is used here to highlight the different levels reached by the users.</td></tr>
<tr><td colspan="2"><b>SECTION E) Messaging section</b></td></tr>
<tr><td>
Scr. n) user selection for messaging page</td><td>From this page, the secondary user will be able to start a chat with the centre user. It is also possible to start a chat with another secondary user (only if the centre has activated this option).
All the users will be grouped by level. So a bottom tab menu bar is shown where the secondary user can filter the other users by their current level.</td></tr>
<tr><td>
Scr. o) chat with one user page</td><td>Once the user has been selected, this chat page is displayed, and from here both users will be able to send messages to each other. Messages are displayed in a friendly way, similar to all common instant messaging apps available nowadays.</td></tr>
<tr><td colspan="2"><b>SECTION F) Rewards section</b></td></tr>
</table>

 Scr. p) available reward catalogue list page	In the rewards section the first page the secondary use will find is the reward catalogue list. The points obtained while completing missions can be exchanged for different rewards, like free coffee, or discounts, depending on what the centre has decided. This rewards are created in the dashboard panel. In this page secondary users will find a list of all the different rewards that they can obtain by finishing the different missions. They will also find that rewards cost different points depending on the user's level. The higher level, the less point a reward will cost.
 Scr. q) exchanged reward list page	Once the user has decided to get a reward, they only have to touch over its corresponding row, and then this reward will be added in the second tab page of this section. This is the exchanged reward page. From this page a secondary user will be able to see all the already obtained and exchanged rewards. Once the secondary user has exchanged a reward, he or she must pick up a valid ticket at their centre.
 Scr. r) acquired reward list page	When the user has collected the voucher at the centre. The centre user will check this action on the dashboard panel, and from now on, a special "acquired" badge will appear for that row. That's how a secondary user can distinguish between already "acquired" rewards and those which are still pending.

SECTION G) Help section	
 Scr. s) contact and help page	The help page is where the user can easily access the chat with a centre user and a shortcut button to make a phone call to the centre in order to solve any doubt or problem about My Mate. The version number is also shown in this page, in order to ensure that the user has an up to date version of the mobile application.

3.4 APIs

The APIs or Application Programming Interface is our nexus with the centre software and it specifies the way our different components should interact with the server and make reading and writing operations over the database. In other words, we have a set of instructions, in terms of functions and procedures, offered by a custom developed REST web service library to be used by the mobile application program to interact with it. So, we will use a set of statements that define the contract of the application with the database and its services.

At the time of building all the different parts of the project, a custom API was developed and provided for both the dashboard and mobile application programs (which may use the services offered).

The API used for the application development was implemented with a REST system as data exchange protocol. REST completely changed the software engineering from 2000. In the field of APIs, REST (Representational State Transfer - Representational State Transfer) is, today, the most globally accepted system for the development of application services.

Each HTTP request contains all the information necessary to execute it, which allows neither client nor server to remember any previous status to satisfy it with the aim that the client can execute in the future the same response for identical requests.

We have implemented the most important operations related to data in any REST system and the HTTP specification, which are the following four: POST (create), GET (read and consult), PUT (edit) and DELETE (delete). Objects in REST are always manipulated from the URI. It is the URI and no other element is the unique identifier of each resource of that REST system. The URI makes it easier for us to access the information for its modification or deletion, or, for example, to share its exact location with third parties.

Now we will describe the different API calls established for the communication over the TCP protocol.

Login a secondary user

POST /api/login/

Method that serves for the login, receives a user and password and returns the user information in case of login. If the login fails it returns 'error': param request:: return: user data or error.

Get the mission list for a secondary user

GET /api/missionsList/{id}/

View to return missions given a SecondUser: param request:: param pk: pk of the SecondUser from which you want to obtain the missions: return: JSON with the inserted data (200) or ERRORS in the fields (400)

Path Parameters

The following parameters should be included in the URL path. **Parameter** id required

Get all detail information for a given mission

GET /api/missionsDetail/{id}/

View to return the detail of a mission given its "pk": param request:: param pk: mission pk to get the details: return:

Path Parameters

The following parameters should be included in the URL path. **Parameter** id required

Get the different status a mission can experience

POST /api/missionsStatus/

View to return or create new states through that a mission can go through. The list or creation will depend on the method that executes the call: GET or POST: param request:: return: JSON with the data inserted or listed (200) or ERRORS in the fields (400)

Medals

GET /api/medals/{centre}/

Returns a list of medal, filtered by centre

Path Parameters

The following parameters should be included in the URL path. centre required

Reject Options

GET /api/rejectOptions/{centre}/

Return a list of possible mission reject options filtered by centre.

Path Parameters

The following parameters should be included in the URL path. **Parameter** centre required

Finish mission question

GET /api/question/{mission}/

Return a list of questions filtered by mission.

Path Parameters

The following parameters should be included in the URL path. **Parameter** mission required

Read profile data

GET /api/profile/{id}/

Method to obtain the detail of a profile given its "pk"

Path Parameters

The following parameters should be included in the URL path. **Parameter** id required

Update profile data

PUT /api/profile/{id}/

Method to update the values of a profile given its "pk"

Path Parameters

The following parameters should be included in the URL path. **Parameter** id required

4. Database and System Integration

4.1 Database system

For the data treatment, we have used the common RDBMS, also known as Relational Database Management System, that provides us a multithreading and multi user technology fitting all of our needs in the MyMate project. We have decided to integrate the database using MySQL technology provided by Oracle due to its great benefits. MySQL is one of the most widespread standards in the database systems worldwide. MySQL technology offers us fast speeds in executing queries and thanks to its native support from the PHP programming language it is the perfect choice to integrate it in the elaboration of our dashboard web application, in the environment of free software.

The MyMate database is based on a standard MySQL base, called Schema. The schema of the database describes the structure of the data that has to be stored, (in this case, Primary and Secondary users, mission data, rewards data, etc.). All this data is stored in a formal language supported by the database management system (DBMS). In the relational database, the schema defines the tables or entities to be stored, its fields in each table, that correspond to the entities attributes and the relationships between each field and each table.

The schema is usually stored in a data dictionary. Although the schema is generally defined in a database language, we will attach the following graphical representation of all the objects, entities, attributes and relationships stored.

4.2 Database relational schema diagrams

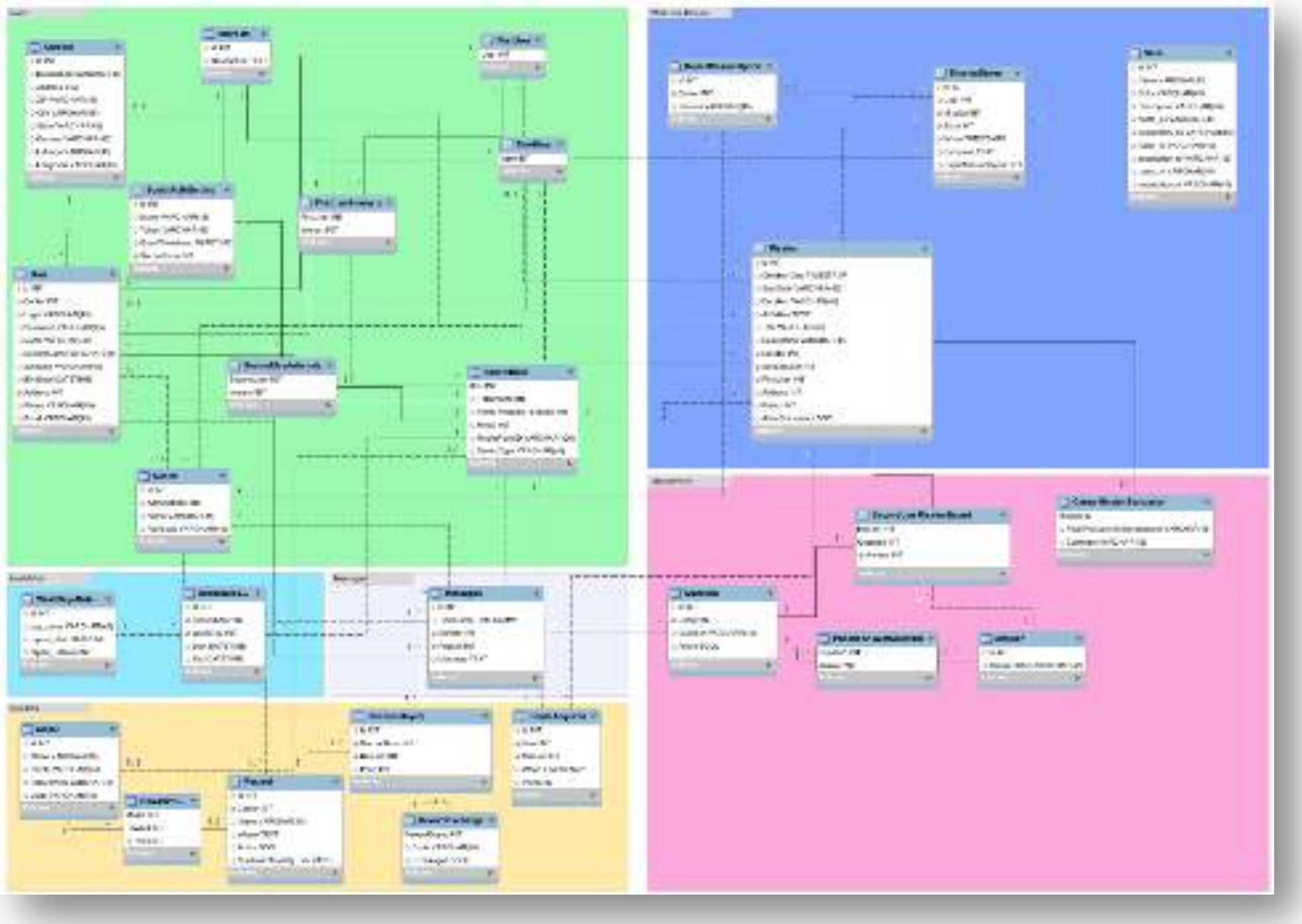


Figure 26. Global Schema of the MyMate database

Now we can detail the Reward System database schema diagram including its corresponding tables, attributes and relationships:

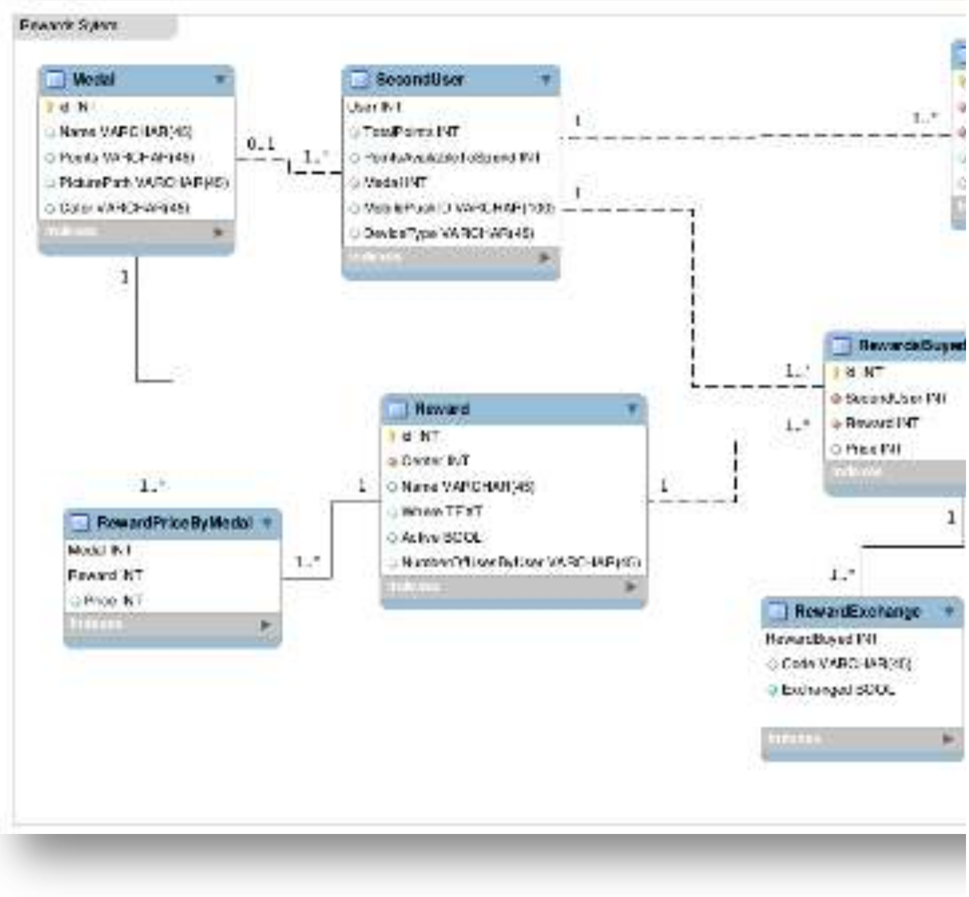


Figure 27. Reward system database

Below, it is depicted the User persistent storage schema diagram in the MyMate database:

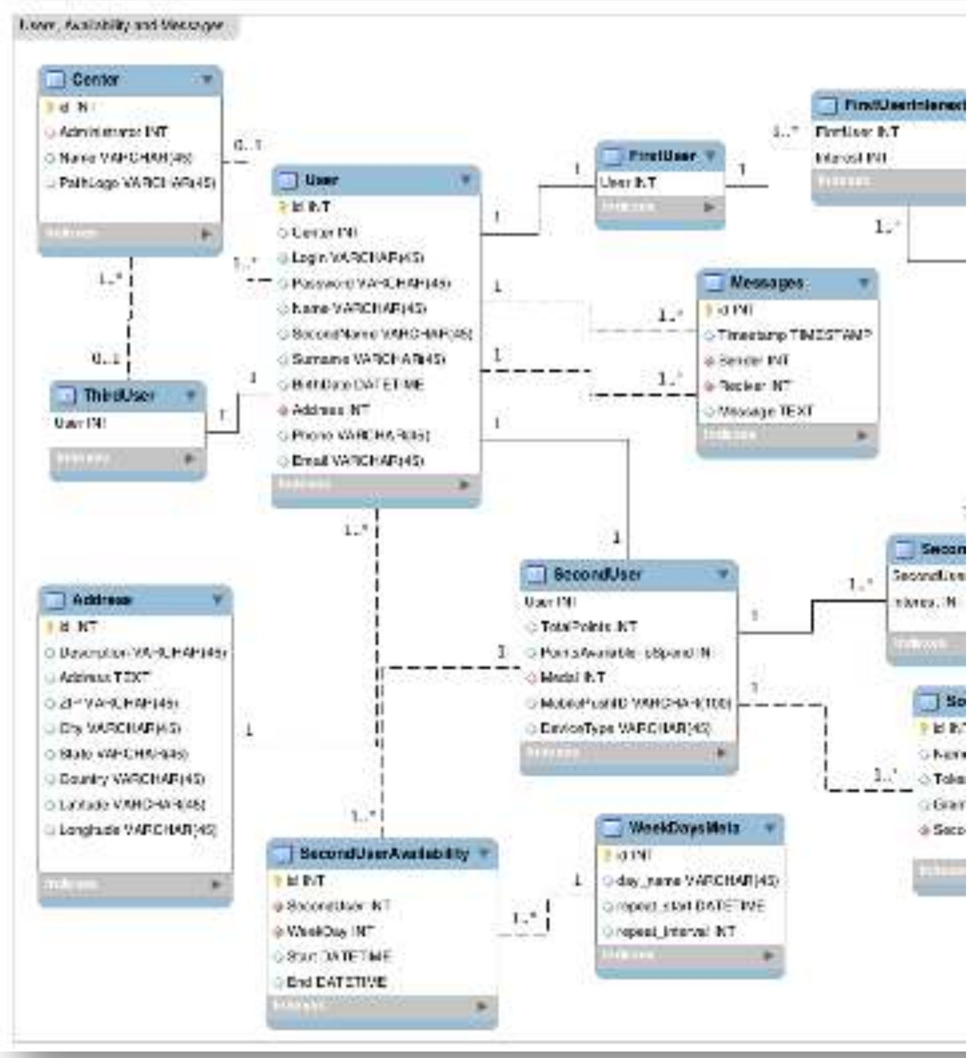


Figure 28. User storage database

Now we can detail the Mission and Reports database schema diagram including its corresponding tables, attributes and relationships:

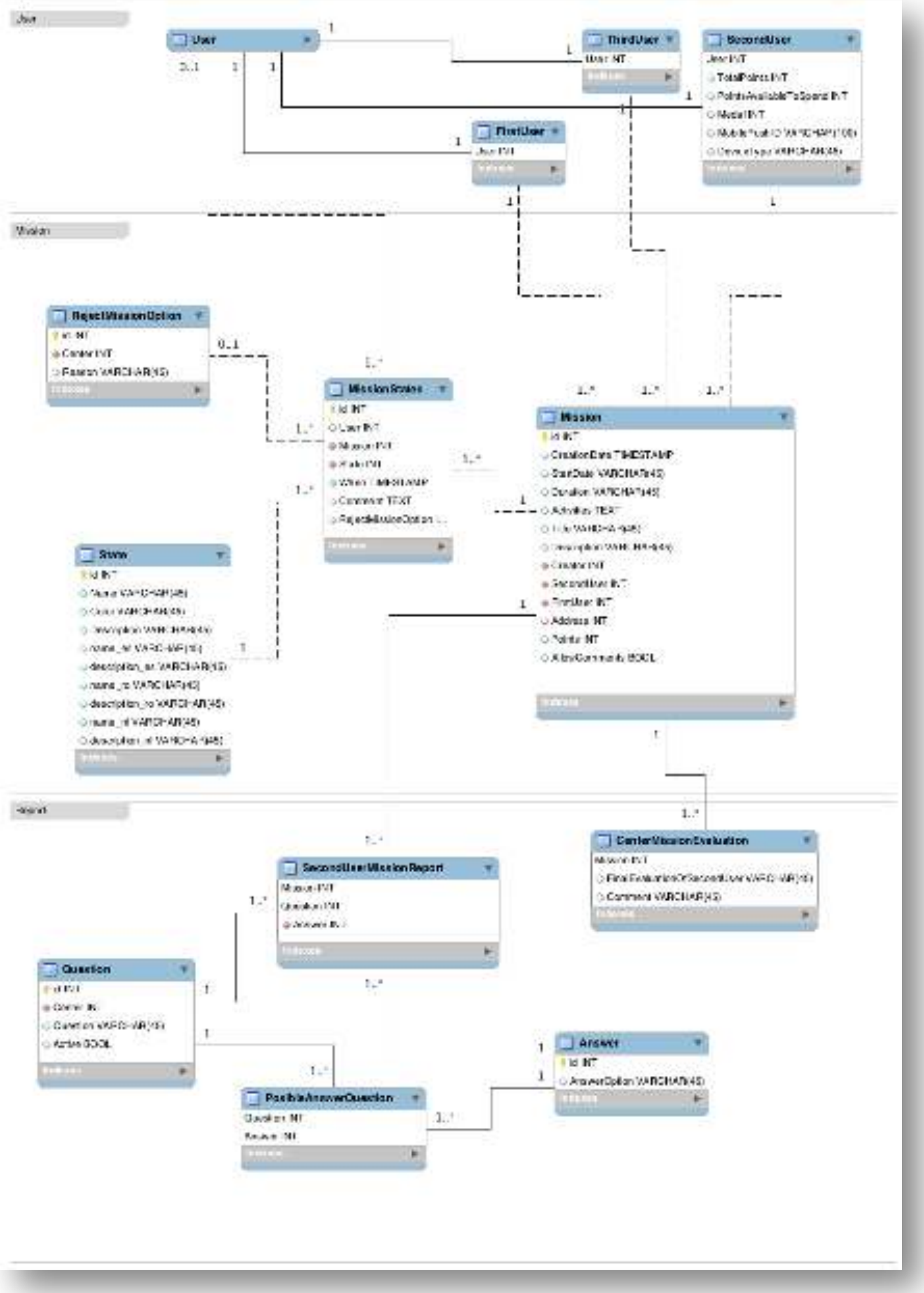
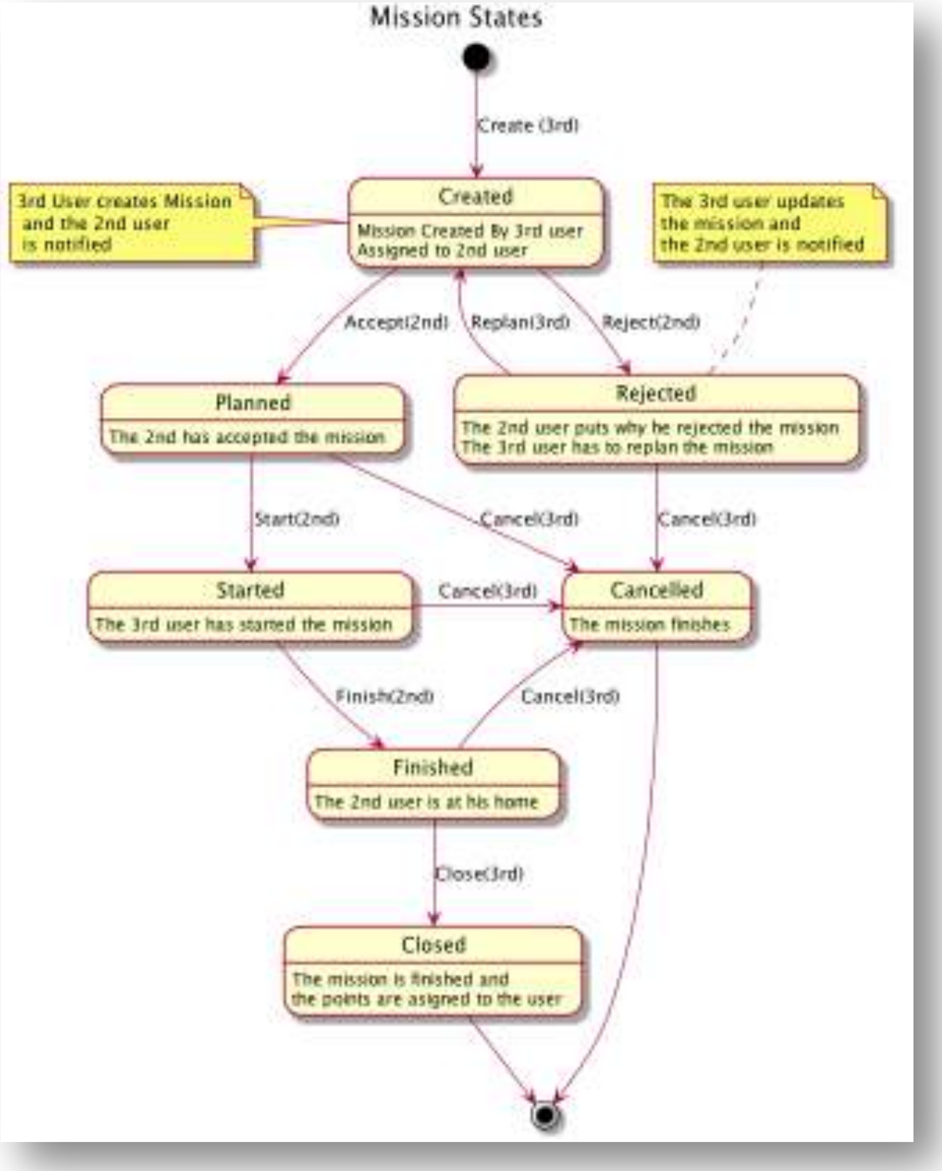


Figure 29. Missions and Reports database

And finally, for the mission or activities data storage we have designed a use case diagram that has been lately converted into a relational schema that is also attached in the following lines:


Mission States
Create (3rd)
3rd User creates Mission and the 2nd user is notified
Created
Mission Created By 3rd user Assigned to 2nd user
The 3rd user updates the mission and the 2nd user is notified
Accept(2nd)
Replan(3rd)
Reject(2nd)
Planned
The 2nd has accepted the mission
Rejected
The 2nd user puts why he rejected the mission The 3rd user has to replan the mission
Start(2nd)
Cancel(3rd)
Cancel(3rd)
Started
The 3rd user has started the mission
Cancel(3rd)
Cancelled
The mission finishes
Finish(2nd)
Cancel(3rd)
Finished
The 2nd user is at his home
Close(3rd)
Closed
The mission is finished and the points are asigned to the user

5. CONCLUSIONS AND FUTURE ACTIONS

The prototype presented in the Mid Term Review meeting and described in this document will be validated by the three centres participating in the project. During the validation phase, the prototype of the Dashboard application will be validated by the tertiary users and the MyMate App installed in tablets or smartphones will be validated by the secondary users in each centre. During the validation and according to the feedback obtained, both applications will be refined, improving and preparing MyMate to be marketed.