**Universidade do Minho**
Escola de Engenharia
Departamento de Informática

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# E•CVoltera , Competence Assessment System.

April 2022

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# E•CVoltera , Competence Assessment System.

Master dissertation
Master Degree in Informatics Engineering

Dissertation supervised by
**Professor Pedro Rangel Henriques**
**Professor António Rui S. Gomes**

April 2022

## STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.
I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.

Diana Lopes

__________________________________

# AGARDECIMENTOS

I want to start by thanking Professor Pedro Rangel Henriques for agreeing to work with me even with the late request. Then to Professor António Rui Gomes and Liliana Magalhães for all their support throughout the project.
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# ABSTRACT

This document presents and discusses a project in the area of managing tools to support teaching. This project is part of the work in the second year of the Master degree in Informatics Engineering accomplished at Universidade do Minho in Braga, Portugal. The main result of this Master's project is an application that allows the Monitor to plan his courses and activities; it also allows the participant to have a better performance in the course in which he is enrolled. From the point of view of Monitor, this tool is intended to facilitate the organization of a course or activity, linking to each task the materials/tools necessary to carry it out. From a Participant's point of view, it aims to provide greater involvement of the participant in the course in which he is enrolled in order to have a better supported evolution. For that purpose, the Participant will be able to attend a course selected from the offer promoted by Escola Competências de Vida (E•CV), obtain more personalized and immediate feedback, increasing his motivation and engagement to learn more. Upon receiving this constant feedback, the participant feels more involved in the activity, acquiring knowledge more naturally, thus potentiating a faster evolution. On the other hand, Monitors, that are responsible for teaching the corses, will find their work easier as all the tasks concerned with each activity (both to provide learning resources to the students or to assess/grade them) are concentrated under the same platform. The system here described is called E•CVoltera. It was designed and fully implemented in order to satisfy the requirements specified by Escola Competências de Vida, an academy created and maintained by a group of professors/researchers of Escola de Psicologia of Universidade do Minho. The system was made accessible to the community as a web platform.

**Keywords:** Skills for life; Teacher support tools; Student support tools; Integration of teaching tools

# RESUMO

Este documento apresenta e discute um projeto na área de ferramentas pedagógicas para apoiar o ensino. Este projeto insere-se no âmbito de trabalho do segundo ano do Mestrado em Engenharia Informática, realizado na Universidade do Minho em Braga, Portugal. O principal resultado deste projeto de Mestrado é uma aplicação que permite ao professor planear os seus cursos e atividades e ao participante ter um desempenho melhor no curso em que está inscrito. No ponto de vista de Monitor, esta ferramenta visa facilitar a organização de um curso ou atividade, interligando a cada funcionalidade os materiais/ferramentas necessárias para a realização da mesma. Num ponto de vista de Participante, visa proporcionar um maior envolvimento do participante no curso em que está inscrito de forma, a ter uma evolução mais acompanhada. Para o efeito, o Participante poderá frequentar um curso seleccionado a partir da oferta promovida pela Escola Competências de Vida (E•CV), obter um feedback mais personalizado e imediato, aumentando a sua motivação e empenho para aprender mais. Ao receber esse feedback constante, o participante sente-se mais envolvido na atividade, adquirindo conhecimento com mais naturalidade, potencializando assim uma evolução mais rápida. Por outro lado, os Monitores, que são responsáveis pela gestão dos cursos, assim terão mais facilidade no seu trabalho quanto a todas as tarefas inerentes a cada atividade (tanto para fornecer recursos de aprendizagem aos alunos como para os avaliar/classificar) estão concentrados na mesma plataforma. O sistema aqui descrito é denominado E•CVoltera. Foi desenhado e totalmente implementado de forma a satisfazer os requisitos especificados pela Escola Competências de Vida, uma academia criada e mantida por um grupo de professores/investigadores da Escola de Psicologia da Universidade do Minho. O sistema foi disponibilizado para a comunidade como uma plataforma web.

**Palavras-Chave:** Competências de Vida; Ferramentas de suporte ao Professor; Ferramentas de suporte ao Aluno; Integração de ferramentas pedagógicas

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# ACRONYMS

**A**

**ARDH** Adaptação, Rendimento e Desenvolvimento Humano.

**B**

**BB** Blackboard Learning System.

**E**

**E-CV** Escola Competências Vida.

**G**

**GCLASS** Google Classroom.

**GNU** General Public License.

**J**

**JWT** JSON Web Token.

# 1

# INTRODUCTION

This dissertation describes the Master's work developed within the scope of the Master's in Informatics Engineering carried out at Informatics Department of University of Minho.

Nowadays there is no doubt that skills for life[1] and psychological factors play an important role in human development and in the performance level achieved by each one (Weiss, 1991). The social impact of training these skills has been recognized internationally due to the fact that it represents an excellent proposal for intervention, whether at the individual, interpersonal level, or even at the level of group organization (Dias et al., 2012).

In this sense, different ways of developing skills for life have emerged, as well as different programs and methodologies used for their learning (V. A. Coelho and Romão, 2016). A British study on this topic raised seven emerging models for the development of social skills for life. They are: the disability model, the competence model, the information-based model, the socialization model, the experiential model, the reflective model, and the counseling model (Mullen, 1981). The resources for the seven models are found in the Life Skills Program, a program that in some countries has been developed, enabling the implementation of several courses, as well as different evaluation systems to assess the effectiveness in the development of skills for life; it allows to know who is working/developing them around the world. In this way, instructors are specifically trained to teach skills for life, and programs are organized around that, (Gould and Carson, 2007) with activities being changed to create ideal conditions to achieve the positive development goals of those who practice them.

In order to follow this evolution, as well as these opportunities in Portugal, E•CVoltera implements and tests some intervention programs to promote the development of life skills for different age groups and contexts (individuals or entreprise teams). It aims to enhance the personal, relational, and social capabilities of people, assuming human growth as a goal through the formation of skills for life [2].

The training service is motorized throughout sessions before, during, and after the program. Throughout the courses students go through several stages, until they obtain approval in the course, from learning how different skills for life work, through the analysis and training of

[1] Life skills: personal resources that people can train and apply in a given situation and then apply to other identical cases in life.

[2] https://www.e-cv.pt/atividades/

what they have learned to the incorporation and application of different skills adapted to their reality. In the last step, the monitors, participants, and people of their living network relationships, observe the application of skills for life. For this to be possible, it is clear that monitors need a platform that allows the management and evaluation of the participant's evolution to be carried out in a faster and more centralized/controled way [3].

## 1.1 MOTIVATION

Currently, E•CVoltera uses some existing tools for their needs, such as Moodle (Dias et al., 2016) for the management and launch of notices to students, Google Forms (Nunes, 2016) for tests, among others, to have access to the features included in, most of the previously mentioned models. However, accounting on the evolution of the courses, in terms of size and complexity and considering the know-how accumulated.

For the user, it is a bit uncomfortable to have to change platforms, during the course. Suppose that the Monitor has to execute two different activities in a course: to create a virtual room and to launch a specific content to student. Actually, to do so, two different platforms would have to be used, Zoom (M.M. Archibald and Lawless, 2019) or Google Meet (Nancy and Shrinika, 2012) for creating a virtual room and Moodle to add a new content (Sabbatini, 2007). In addition, many times there is also the need to play a license to use some platforms such as Zoom [1] or Google Meet [2]. Moreover whenever an assessment task is performed, it is necessary to manually import the grades generated by the autograding tool used into the environment where the Monitors compiles and manages the students marks. Considering that task of grading students, it becomes clear that the existence of more than one non-integrated working platforms is inconvenient and shall be avoided.

Observing all the difficulties described above, the E•CVoltera Leaders came to the conclusion that is was urgent to create a web platform providing the various functionalities necessary to conveniently support the courses they offer, allowing their monitors to follow the evolution of participants in their Training activities.

Summing up, it is of most importance to develop a web platform that can support all the activities inherent to the implementation of a training program, so that the monitors can carry out their tasks without having to access different platforms and the student can access different information about the course at the same location. This is exactly the objective of this Master's project.

[3] https://www.e-cv.pt/

[1] https://zoom.us/pricing

[2] https://workspace.google.com/intl/pt-pt/pricing.html

## 1.2 OBJECTIVES

The objectives of this Master's work are as follows:

- Analize carefully the given to extract all functional and non-functional requirements to guide the development of the desired platform to effectively support Monitors and Participants of the E•CVoltera courses;

- Develop a web platform that allows the Monitor to plan the course, provide learning resources or assessment materials, and follow up students progress; the web application should also provide participants with faster and more accurate feedback;

As a final result, it is expected to have an application that can be easily used by Monitors and E•CVoltera Participants. This application will be very useful to assist Participants in the course they are enrolled in.

## 1.3 RESEARCH HYPOTHESIS

It is possible to develop a platform that brings together all the necessary features for a friendly use both for those who manage the course and for those who are enrolled in it. This platform will be responsible for integrating the different functionalities, accessing different platforms useful for a good management/achievement of the course.

## 1.4 RESEARCH METHOD

Since the thematic area of this thesis is not the same as that of those who are developing the platform, several meetings and observations were held in order to understand the difficulties experienced, the problems that arise, and the different solutions that can be addressed. The results of the requirment elicitation task are presented and discussed in Chapter 3. After the analisis phase (including the requirements gathering step), and the literature research phase to better understand the problem and the available alternatives, the architecture of the desired system was drawn. The next phase was the implementation.
Along the development, frequent meetings with E•CV founders were held to obtain immediate feedback before proceeding to the next step. Everytime a problem was found, the previous phases were revisited to fix the draw backs identified.

## 1.5 DOCUMENT STRUCTURE

This document is organized in six chapters. In Chapter 2 is presented the State of the Art that covers the main concepts in the domain of a course preparation, implementation, as well as a survey on course tools. The general architecture of the system to be implemented to accomplish the objectives and the E•CVoltera design are presented in Chapter 3. Chapter 6 concludes this report with a summary of the main ideas presented in each chapter, the Master's contributions, and directions for future work. Additionally the complete lists of the Platform functional and non-functional requirements are presented in Appendixes A and B. Appendix C, the last one, includes an User's Guide delivered to the Enduser with the software developed.

# 2

# ACADEMY MANAGEMENT

In this chapter the main objects involved in this Master's Thesis will be introduced and reviewed. The search for existing tools to create and manage courses and their components is also important in order to study the problem at hand.

## 2.1 THE COURSE/ACADEMY

Over the years, more and more courses have appeared, with different purposes and with different forms of teaching. As each course has different needs and durations, they end up needing to use different platforms depending on their needs. Courses can be classified in different ways: Technical courses, Higher courses, Professional courses, and Training courses [1].

Higher education courses cover university education and polytechnic education and are taught in public and private institutions, with different areas and plans [2]. Technical courses are more focused on training people for the labor market and not for a field of chosen survey [3]. For this, the way that the content is passed on to students is aimed at theoretical and practical classes that allow preparing the student to exercise the profession. The professional courses are identical to the technical courses, the professionals also have the as main objective to train the student soon so that he can start working (Cunha, 2005). The big difference between the two is that the first is of secondary level, that is, the student needs to have completed high school while in the professional course, the student does not need to have finished high school. Finally, training courses, these courses do not require any training. There are several types of training courses, which prepare people for the job market, for teaching, and for life. Some last longer and are more in-depth, others last less and are more practical [1].

That said, as there are different types of courses, there are also different platforms that try to correspond to the main needs of the academies/courses. Each course uses the tool it considers most complete to meet all its needs and, as technology is constantly evolving, the

[1] https://orientu.com.br/blog/cursos/tipos-de-cursos/
[2] https://www.dges.gov.pt/pt/pagina/sistema-de-ensino-superior-portugues
[3] https://www.guiadacarreira.com.br/cursos/curso-tecnico/curso-tecnico/

tool changes (Quevedo and Ulbricht, 2010) when another more complete one appears than the one currently used.

However, in the past year, with the COVID-19 Pandemic, the education landscape has changed. From the classic teaching and learning system, we started to need access to new platforms that would allow knowledge to continue to pass normally, which required some changes in the platforms used (Oliveira, 2020).The technical requirements of online teaching are much higher than traditional classroom teaching (Bao, 2020) and new platforms are needed, for example, streaming and chat tools, to ensure the functioning of classes and after classes.

## 2.2 COURSE/ACADEMY TOOLS

We have platforms that only focus on a specific function, such as Zoom[4], Google Meet[5], even platforms that gather different needs, such as managing students, notices, calendars, among others. These platforms are the most used when teaching/participating in a course, and we have as main examples the Blackboard[6], Moodle[7], Google Classroom[8], among others, all of them with pros and cons.

### 2.2.1 *Platforms to Manage Courses*

Nowadays, with the use of e-learning platforms, it is easy to create, setup and teach a course, aiming at citizen education and training[9]. There are different e-learning platforms, the most used in the world are[10]: Moodle, Author, Dokeos, Caroline, Blackboard, Sakai, Desire2Learn, eCollege and TelEduc. In addition to the list presented, there are also other platforms targeting the management of courses/academies, such as: Google Classroom, Udemy, Canvas, Edmodo and the others.

#### *Blackboard Learning System*

Blackboard Inc. provides powerful and easy-to-use systems for educational instruction, communication, and assessment (Bradford and Porciello, 2007). One of

Figure 1: Blackboard Inc. Logo

[4] https://zoom.us/

[5] https://meet.google.com/?pli=1

[6] https://elearning.uminho.pt/

[7] https://moodle.org/?lang=pt

[8] https://classroom.google.com/u/0/h

[9] https://www.estudiosite.com.br/site/educacao-a-distancia/quais-as-5-melhores-plataformas-de-e-learning-do-mercado

[10] https://www.unasp.br/blog/plataformas-de-e-learning/

the systems created was the Bb, a course management system for in-person and online educational assistance. This platform was designed with an intuitive and personalized interface involving students in order to relieve the work of teachers, being a paid platform[11].

Bb allows several features (Sá, 2010), divided into different sections, such as:

- Announcements, through which teachers can post messages and reminders for students;
- Chat, allows students who are online to chat with each other in real-time;
- Discussion, allows the teacher to discuss a topic on which students can develop reflections and discuss ideas;
- Course Content, allows the teacher to provide texts and bibliographic references related to the course;
- Calendar, teachers can inform the exam and delivery dates;
- Learning Modes, allows the teacher to add additional lessons and exercises to those given in the classroom;
- Assessments, allows the teacher to provide tests which can be accessed and performed through the internet;
- Assignments, students can be appointed by the teacher to present work and assignments;
- Media Library allows the creation of a collection of videos and other audiovisual media;
- Other Goals, allows the teacher to set short and long term goals for the class;
- Roster, professor and students can access the list of students enrolled in the course;
- Syllabus, the semester program for the class can be obtained;
- who's online, teacher and students can see who is logged in at that moment and establish communication.

[11] https://www.blackboard.com/teaching-learning/learning-management/blackboard-learn

### *Moodle*

Moodle is a platform that allows the sharing of resources electronically and is a means of communication between the agents involved, enabling the distribution of resources in electronic format, providing elements essential to success in the various courses. Additionally, it is a means of communication and information sharing between agents, providing forums, chats, or questionnaires.

Figure 2: Moodle Logo

The success and widespread use of Moodle as a preferred platform for resource sharing, teaching, and distance learning are based on essential characteristics such as interoperability and modularity, having had a global acceptance by parts of the educational communities (Ministério da Educação and da Educação , GEPE).
This platform allows several features related to the fundamental entities for the implementation of a course [12], such as:

- Activities, this block lists all possible activities to be carried out in the course, such as forums, questionnaires, tests, etc. The first time you enter the course, the only activity that will be listed is the forums, more specifically the news forum that is defined by default. The list of activities increases as they are created by the teacher;
- Administration, we are given information about the grades obtained in each of the curricular units;
- Subjects, these are all curricular units to which we are enrolled in the current academic year;
- Upcoming Events, In this block it is possible to view the upcoming events, based on the calendar. It also has a link to the calendar and another to add new events;
- Recent Activity, This block shows what has changed since you last accessed the course. It is a good way for students to keep abreast of the course's various activities;
- Calendar, this block shows the events that are taking place in the course. The events are added to the calendar and are aimed at a particular user, a group or all individuals in all courses taught by the school. If defined, the end dates of the events will also appear on the calendar, that is, the deadline for registration, participation in a particular forum, etc.

[12] https://sites.google.com/a/eu.ipp.pt/moodle/modo-de-utiliza-ao/funcionalidades

### *Google Classroom*

GClass offers a simple platform for teachers who teach and generally need to share introductory information, exercises and supplementary materials with students (Izenstark and Leahy, 2015). This platform is considered one of the best platforms to facilitate the work of teachers, helping them to save time, keep classes organized, and improve communication with students. It is available to anyone with Google Apps for Education, a free suite of productivity tools including Gmail, Drive and Docs (Iftakhar and Bangladesh, 2016).

Figure 3: Google Classroom Logo

This platform also provides some features to its users[13], such as:

- Mural, where you can see the class code, upcoming activities and go out and schedule a message for the class. The student (s), in addition to you, as a teacher, can create notices, schedule notices, attach files and links;
- Activities, one of the most important menus within GClass, this menu has access to the teacher and the student. From the point of view of teachers, they can create activities, as well as have access to the class folder where all the tests, activities, and assignments are stored. For students, this has access to all their work, the class schedule, and the folder inside Google Drive, containing files and support material that the teacher or colleagues can add.
- People, in this menu, the teacher can invite his students, coordinators and/or even a guest teacher to his virtual classroom;
- Notes, this menu allows the teacher to assign a note to an activity, work, test that he has previously created.

### *Udemy*

Udemy platform is an online learning platform. Despite the various features it presents and being a platform that is prepared for several types of courses, from Academias to Lifestyle, it is a paid platform (I. Cetina and Manea, 2018).

Figure 4: Udemy Logo

This platform has several features: it is possible to create and view video/audio classes, create and make tests, put

[13] https://vitaminanerd.com.br/google-classroom/

subtitles on videos, download lessons as well as certificates, perform coding exercises as well as questions and answers, create and consult observations, publish evaluations and consult them, see and create advertisements, send messages to the teacher, search by categories, since it is distinguished from different courses and register in the courses sought [14].

These platforms presented, despite having been developed for the same purpose, have pros and cons concerning there practical usage. Table 1 compares some important features regarding the context of this Master's work.

| Platform | Paid | Support for Different Courses | Organization of courses by category |
|---|---|---|---|
| Blackboard | Yes | Yes | No |
| Moodle | No | Yes | No |
| Google Classroom | Yes | Yes | No |
| Udemy | Yes | Yes | Yes |

Table 1: Course Management Platforms

### 2.2.2 *Tools for specific activities*

The platforms that aim to assist the teacher in the management of a course/academy include the main functionalities as seen in the previous section. However, there are always some other features that are not part of those standard e-learning platforms, such as: the creation of online tests that after the assement session, mark the tests and calculate the grade obtained; or the functionality of conducting a video lesson or video conference. These functionalities are available in special purpose platforms.

In this way, some platforms were found. They proved to be important for these "small features" that sometimes go unnoticed, for example:

- To fully support video lesson: Zoom, Google Meet, Jitsi Meet and Microsoft Teams;
- To prepare/answer online tests: Google Forms, ProProfs, Mentimeter, EasyTestMaker, socrative, kahoot and Qualtrics.

In relation to videoconferencing systems. Each of the platforms has more or less attractive aspects, as we can see in Table 2.

[14] https://support.udemy.com/hc/pt/articles/229233847-Plataformas-e-recursos-da-Udemy

[10] https://zoom.us/pt-pt/meetings.html

[11] https://workspace.google.com/intl/pt-pt/security/

[12] https://meet.jit.si/

[13] https://www.microsoft.com/pt-pt/microsoft-365/microsoft-teams/free

| Platform | Unlimited free meeting access | Forum | Multiple Participants Share Screen |
|---|---|---|---|
| Zoom[10] | No | No | No |
| Google Meet[11] | No | No | No |
| Jitsi Meet[12] | Yes | Yes | Yes |
| Microsoft Teams[13] | No | Yes | No |

Table 2: Video Lesson Platforms

The same happens the platforms to create online tests, calculating the final grade. The choice of which platform to use depends on the features/data that these platforms provide to the end user, before, during and after performing a test, as shown in the Table 3.

| Platform | Question analysis reporting | Export Information | Automatic evaluations |
|---|---|---|---|
| Google Forms[14] | Yes | Yes | Yes |
| ProProfs[15] | Yes | Yes | No |
| Mentimeter[16] | No | Yes | No |
| EasyTestMaker[17] | Yes | Yes | Yes |
| Socrative[18] | Yes | Yes | Yes |
| Kahoot[19] | Yes | Yes | Yes |
| Qualtrics[20] | Yes | Yes | Yes |

Table 3: Online Tests Platforms

Depending on what each platform offers, teachers choose the one that best matches their purpose as well as those that enable simpler usability, with which they work better and faster.

## 2.3 ACADEMY MANAGEMENT SUMMARY

In short, there are many and powerful Academy Management platforms that follow the evolution of technology. All course management platforms found in the literature and discussed above have their purpose in common but the features offered are different.
Specially in the last year, there was a strong demand for each of these platforms to evolve and integrate more and more features in order to meet the needs felt by their users under pandemic times that have forced every school all over the world to turn to just online services.

[14] https://www.google.com/forms/about/
[15] https://www.proprofs.com/
[16] https://help.mentimeter.com/en/articles/410463-how-to-create-a-quiz-competition
[17] https://www.easytestmaker.com/
[18] https://www.socrative.com/
[18] https://kahoot.com/schools/
[20] https://www.qualtrics.com/

This strong demand motivates their evolution and increment, thus emerging new features ; however, in some cases the creation of new more specific platforms, more focussed in some particular contexts, have occured.

# 3

# E•CVOLTERA PROPOSAL

This chapter details the Master's project proposal. The first section describes E•CV and some of the problems. The following sections detail some of the features required to be implemented, resulting from observations and meetings held with the E•CV Founders and Managers. Finally, in the last section a system architecture is proposed, designed to respond to all requirements.

## 3.1 E•CV

Now focusing on the theme of this Master's work, the E•CV, usally known as the School of Life Skills, works with six different Programs, Figure 5.

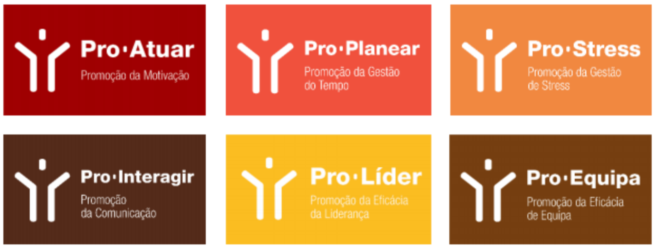
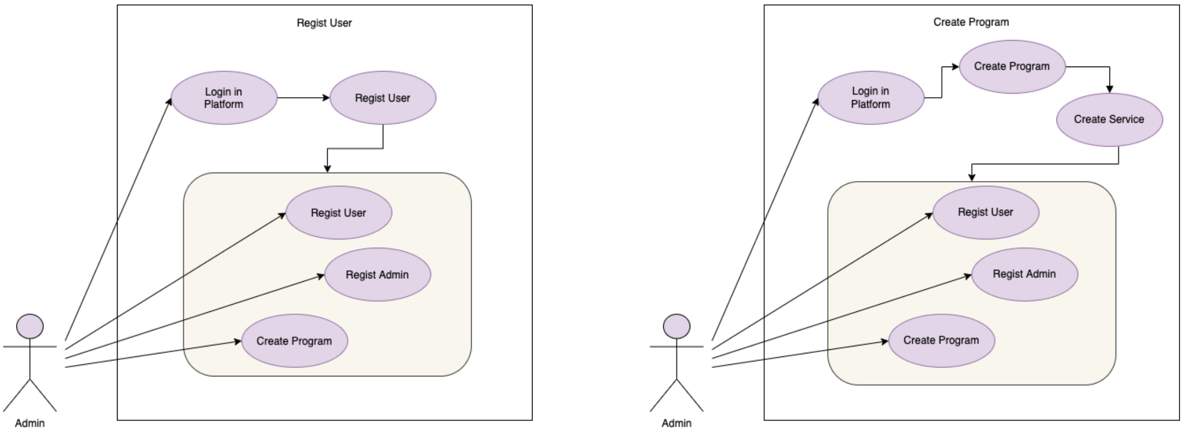

Pro·Atuar
Promoção da Motivação
Pro·Planear
Promoção da Gestão do Tempo
Pro·Stress
Promoção da Gestão de Stress
Pro·Interagir
Promoção da Comunicação
Pro·Líder
Promoção da Eficácia da Liderança
Pro·Equipa
Promoção da Eficácia de Equipa

Figure 5: E•CV Services

Each of these Programs corresponds to different types of courses (Academy, Consulting, Personalized Training, Monitoring, and Society) (E-CV and ARDH, 2019) and each of them uses the most useful platforms for the different functionalities needed. Each course has a different duration, purpose, and number of participants, however, the ideal was to be able to use the same platform to cover all the needs of all courses without being necessary specific licenses, or even pay for the software.

In the past video conferences were sometimes necessary, however today this need has become something essential for the implementation of a course, as all classes and activities shall be carried out virtually (Formiga, 2020). Thus, there is an increasing demand for platforms to hold these videoconferences, ideally trying not to be connected to any type of license or pay



(a) Admin Regist User on the Platform

(b) Admin Create an Program

Figure 6: Participant use case diagrams

for the software.
Finally, E•CV seeks and idealizes the use of platforms that facilitate the Monitor the course management as well as for the participant, so that both users feel involved and motivated with the topic covered during the course.

## 3.2 USE CASE DIAGRAMS

For the first phase of the project, it was decided to design use cases to understand what users can do and when.
In the desired software system there are 3 differents actors:

- The Admin,
- The Monitor,
- The Participant.

From the Admin's point of view, three use case diagrams were developed, this diagram shows all the steps that the user needs to do until reaching the action he wants. They were developed in this way so that a more complete and simple reading is possible. First to define registering a user (Monitor or Participant) on the platform, Figure 6a, the second to specify the actions necessary to create an Program,Figure 6b, and, finally, a third one to define the task of associating Monitors to a Service, Figure 7.

From the Monitor's point of view, wo use case diagrams were developed, the first to pecify the actions necessary to create an Activity, Figure 8a, the second to describe the tasks of registration of students' presence and class summaries for one Session,Figure 8b.

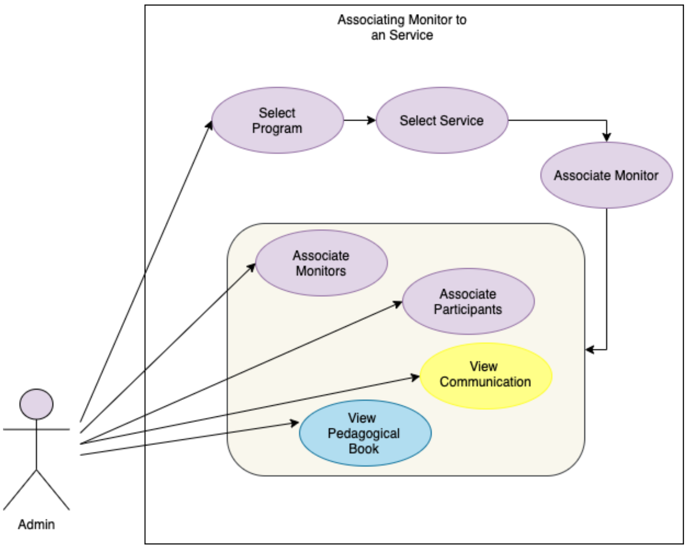
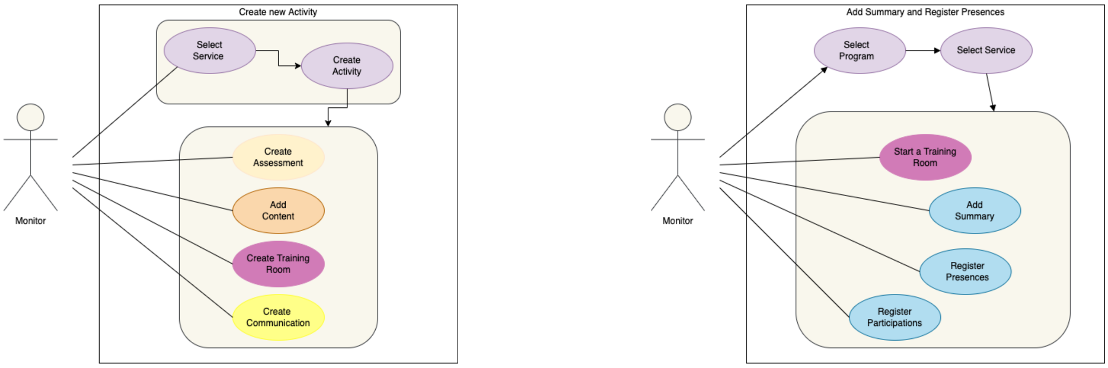


Figure 7: Admin Associating Monitors to a Service

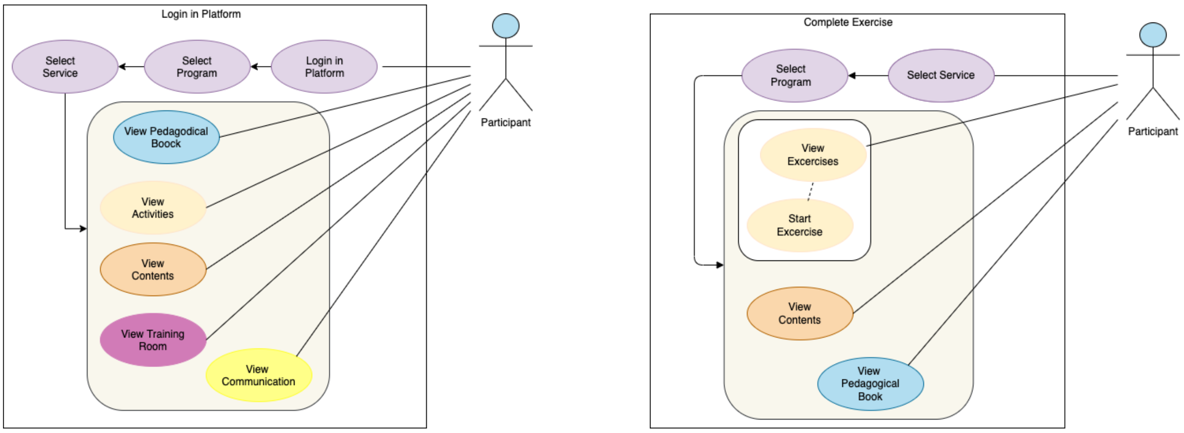


(a) Monitor create an Activity

(b) Monitor add Summary and Register Presences

Figure 8: Monitor use case diagrams

From the Participant's point of view, the first diagram defines the set of information items that a Participant can access after logging in the platform, Figure 9a , the second diagram illustrates the activities and information available to the Participant when he chooses to solve an exercise, Figure 9b.



(a) Overview Participants flow in Platform

(b) Participant complete exercise

Figure 9: Participant use case diagrams

## 3.3 SYSTEM FLOW DIAGRAMS

After drawing the use case diagrams, the flow diagrams were drawn to describe all the activities allowed in the platform as will be described along the rest of this section.
The first diagram corresponds to an Admin of the Academy. When Admin login into the academy platform, element A in Figure 10, go to the Home page where is able to:

- *View My Account*, element 1 in Figure 10
- *Create Program*, element 2 in Figure 10
- *View Program*, element 3 in Figure 10
- *Create Admin*, element 4 in Figure 10
- *Create Monitor/Participant*, element 5 in Figure 10
- *View Monitors/Participants*, element 6 in Figure 10
- *View Admins*, element 7 in Figure 10
- *Logout*, element B in Figure 10

The Admin can perform any of these actions at any time in the order he deems most appropriate.

- If Select the *View My Account* option the user can see all information associated to his account and can edit some of that information.
- The Admin is able to select *Create Admin* or *Create Monitor/Participant* and in these pages he can create one Admin User, Monitor User or Participant User. After creating

these records, the user returns to the home page. Where he can select option *View Monitors/Participants* or *View Admins* and see all users already registered.

- If Select the *Create Program* option the user can create a new Program for the Accademy and after creating he goes to the program page. Selecting the *View Program* option then the Admin will go to the home page of the Program. In Program page the Admin user is able to:
  - *Create Service*
  - *View Service*
  - *Logout*, element B in Figure 10

If Select the *Create Service* option the user can create a new Service for the Program and after creating he goes to the Service page. Selecting the *View Service* option then the Admin will go to the home page of the Service. In Service page the Admin is able to:

- *Add Participant*, element 8 in Figure 10
- *Add Monitor*, element 9 in Figure 10
- *Delete Service*, element 10 in Figure 10
- *View Participants*, element 11 in Figure 10
- *View Monitors*, element 12 in Figure 10
- *Logout*, element B in Figure 10

The Admin can perform any of these actions at any time in the order he deems most appropriate.

- If Select the *Add Participant* or *Add Monitor* option then he can associate one or more Participants or Monitors in Service and is able to go *Back to the Service Page*.
- If Select the *Delete Service* option then he can delete this Service from the Program and is able to go *Back to the Service Page*. This option is only available when the start date is after today or the end date is earlier than today.
- If Select the *View Participants* option then he can View all Participants in a Service and is able to go *Back to the Service Page*.
- If Select the *View Monitors* option then he can View all Monitors in a Service and is able to go *Back to the Service Page*.

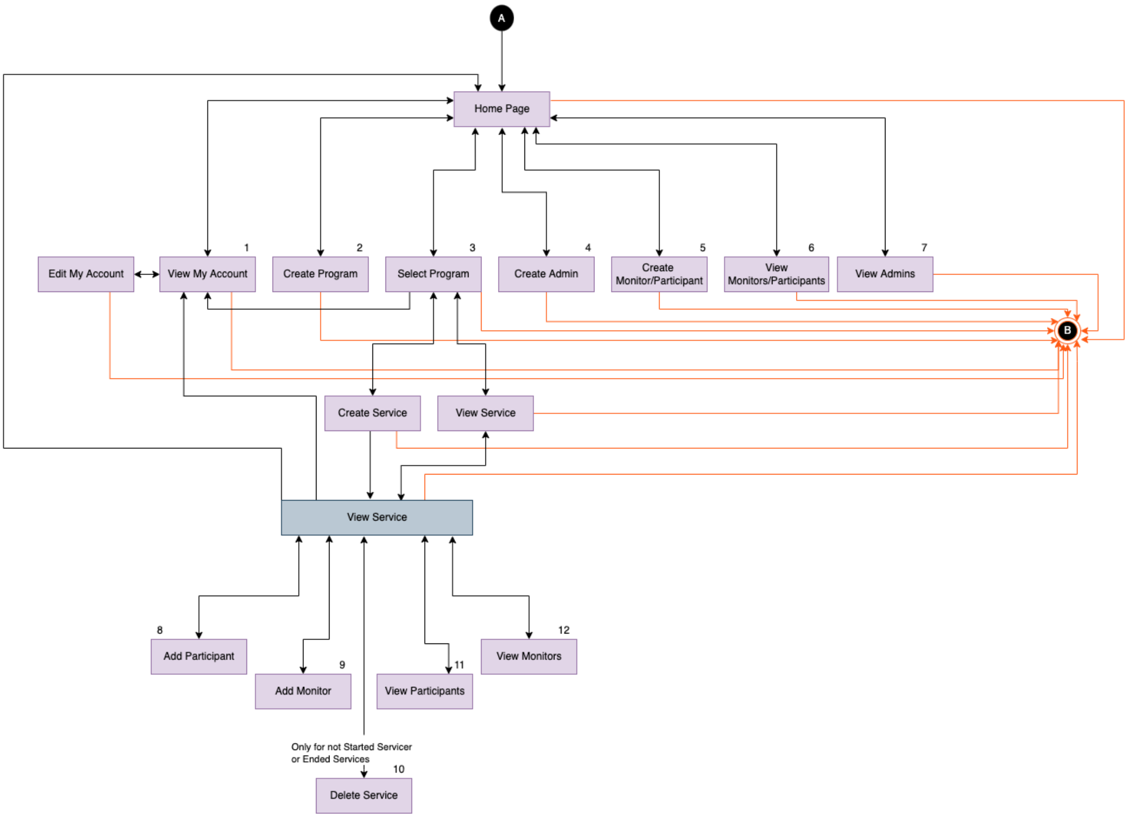


Figure 10: Admin Flow Diagram

The Second diagram corresponds to a Monitor of the academy. When Monitor login into the academy platform, element A in Figure 11, he enters the Home page where is able to:

- *View My Account*
- *View Program*
- *Logout*, element B in Figure 11

If Select the *View My Account* option the user can see all information associated to his account and can edit some of that information.
If Select the *View Program* option then the Monitor will go to the home page of the Program. In Program page the Monitor is able to:

- *View Service*
- *Logout*, element B in Figure 11

If Select the *View Service* option then the Monitor will go to the home page of the Service. In Service page the Monitor is able to:

- *View Participants*, element 1 in Figure 11

- *View Monitors*, element 2 in Figure 11
- *View Pedagogical Book*, element 3 in Figure 11
- *View Activities*, element 4 in Figure 11
- *View Assessments*, element 5 in Figure 11
- *View Training Room*, element 6 in Figure 11
- *View Opinions Forum*, element 7 in Figure 11
- *View Communications*, element 8 in Figure 11
- *View Contents*, element 9 in Figure 11
- *Logout*, element B in Figure 11

The Monitor can perform any of these actions at any time in the order he deems most appropriate.

1. If select the *View Participants* option Admin can see all Participants in the Service.

2. If select the *View Monitors* option Admin can see all Monitors in the Service.

3. Selecting the *View Pedagogical Book* option then he can:

   - *Back to the Home Page*
   - *Add Summary and Register Presence*
   - *Register Participation of Participant*
   - *View Participation of Participant*
   - *View Summaries*

   If select *Add Summary and Register Presence* the user can write a summary and register presences of participants in Session. If select *Register Participation of Participant* the Monitor can register participation of Participant in session. And after this points we can view all *Participation of Participant* and all *Summaries* register.

4. Selecting the *View Activities* option then he can *Back to the Home Page*, *Register New Activities*, *View Activity* or *Delete Activity* (if activity has not yet Started or Ended).
   If select the *Register New Activities* option the monitor can register new Activity in the Service and, after this, he will can go to the *Edit Activities* (if this activity not started) where have edit activity parameters. When he selects *View Activity* option, he will go to the activity page and can access to the *Edit Activities*. Else, if select *Delete Activity* option he can delete this Activity.

5. Selecting the *View Assessment* option then he can *Back to the Home Page* or *Edit Assessment* of the participant in one Test (this option is only available for not started Assessment or only can edit the Note Field if the test did not generate an automatic grade).
   If select the *Edit Classifications* option, he can:
   - *Edit Assessment*
   - *Back to the Classifications Page*
6. Selecting the *View Training Room* option the he can *Back to the Home Page*, *Create a new Training Room* or *Start a Training Room* in the Service.
7. Selecting the *View Opinions Forum* option then he can *Back to the Home Page* or *Add Opinion* in the Options Forum.

   If select the *View Comments* option can see all comments registered in system related to one Participant. But, if select the *View Commentators List* option the user can see all Commentators List registered for one Participant. Else, if select the *Launch Form for Commentators* the Monitor can launch the question form for the commentators registered.
8. Selecting the *View Communications* option then he can *Back to the Home Page* or *Add Communications* in the Program.
9. If select the *View Contents* option then he can *Back to the Home Page* or *Add Contents* in the Program.

The last diagram corresponds to a Participant of the academy. When Participant login into the academy platform, element A in Figure 12, he is directed to the Home page where is able to:

- *View My Account*
- *View Program*
- *Logout*, element B in Figure 11

If Select the *View My Account* option the user can see all information associated to his account and can edit some of that information.
If Select the *View Program* option then the Participant will go to the home page of the Program. In Program page the Participant user is able to:

- *View Service*
- *Logout*, element B in Figure 11

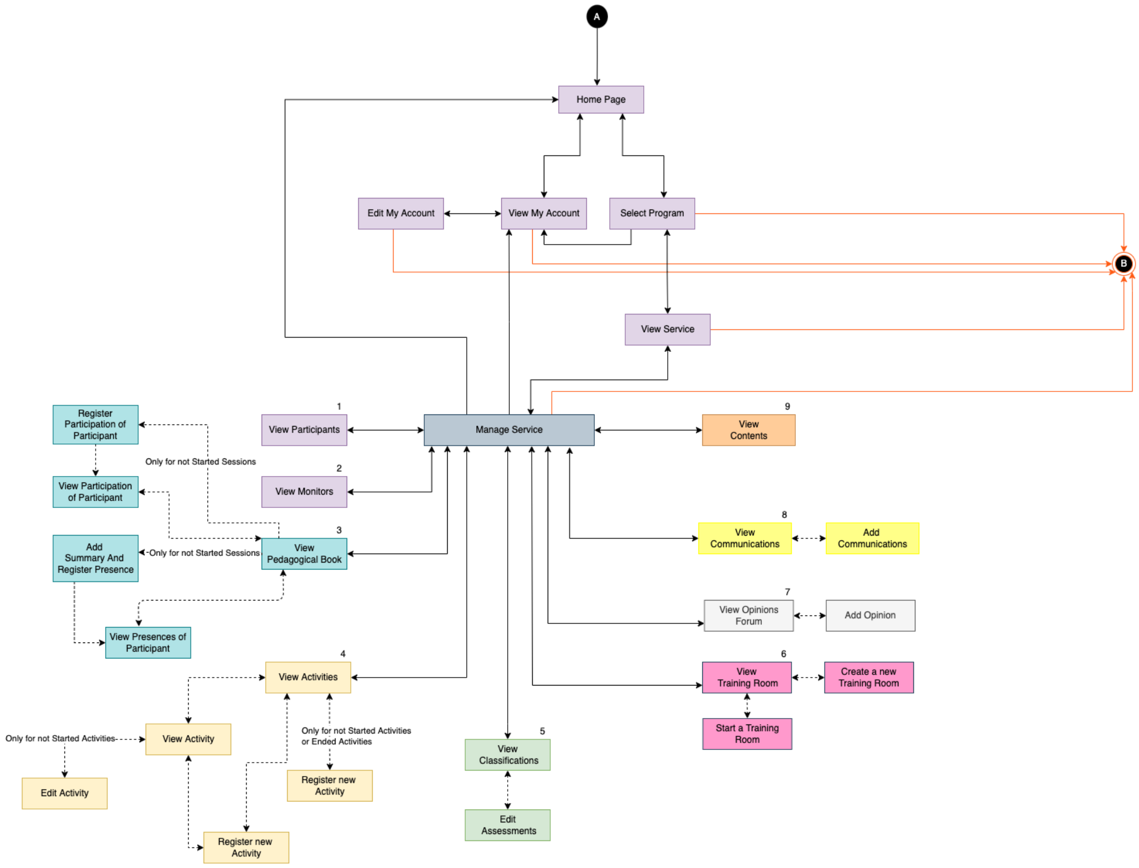


Figure 11: Monitor Flow Diagram

If Select the *View Service* option then the Participant will go to the home page of the Service. In Service page the Participant user is able to:

- *View Participants*, element 1 in Figure 12
- *View Monitors*, element 2 in Figure 12
- *View Pedagogical Book*, element 3 in Figure 12
- *View Activities*, element 4 in Figure 12
- *View Assesments*, element 5 in Figure 12
- *View Training Room*, element 6 in Figure 12
- *View Options Forum*, element 7 in Figure 12
- *View Communications*, element 9 in Figure 12
- *View Contents*, element 10 in Figure 12

- *Logout*, element B in Figure 12

The Participant can perform any of these actions at any time in the order he deems most appropriate.

1. If select the *View Participants* option the Participant can see all Participants in the Service.

2. If select the *View Monitors* option the Participant can see all Monitors in the Service.

3. Selecting the *View Pedagogical Book* option then he can:

   - *Back to the Home Page*
   - *View My Participation*
   - *View Presences*
   - *View Summaries*

   If select *View My Participation* the user can see his participation in all sessions. Then he can view all *Presences* and all *Summaries*.

4. Selecting the *View Activities* option then he can *Back to the Home Page* or *View Activity*. Selecting the *View Activity* option, he will go to the activity page and can see all information associated to the activity.

5. Selecting the *View Assessment* option then he can go *Back to the Home Page* or *Do an Assessment*.

6. Selecting the *View Training Room* option the he can go *Back to the Home Page* or *Enter in a Training Room* in the Service.

7. Selecting the *View Opinions Forum* option then he can go *Back to the Home Page* or *Add Opinion* in the Options Forum. On this page, he can see all Opinions added on the Service.

   If select the *View Comments* option the Participant can see all comments registered related to him. Selecting the *View Commentators List* option the user can see all Commentators List registered for this Participant. Else, if select the *Add Commentators* the Participant can add one commentator to yours list.

8. Selecting the *View Communications* option then he can *Back to the Home Page*. On this page, he can see all communication in the Service.

9. Selecting the *View Contents* option then he can *Back to the Home Page*. On this page, he can see all Contents on the Service.

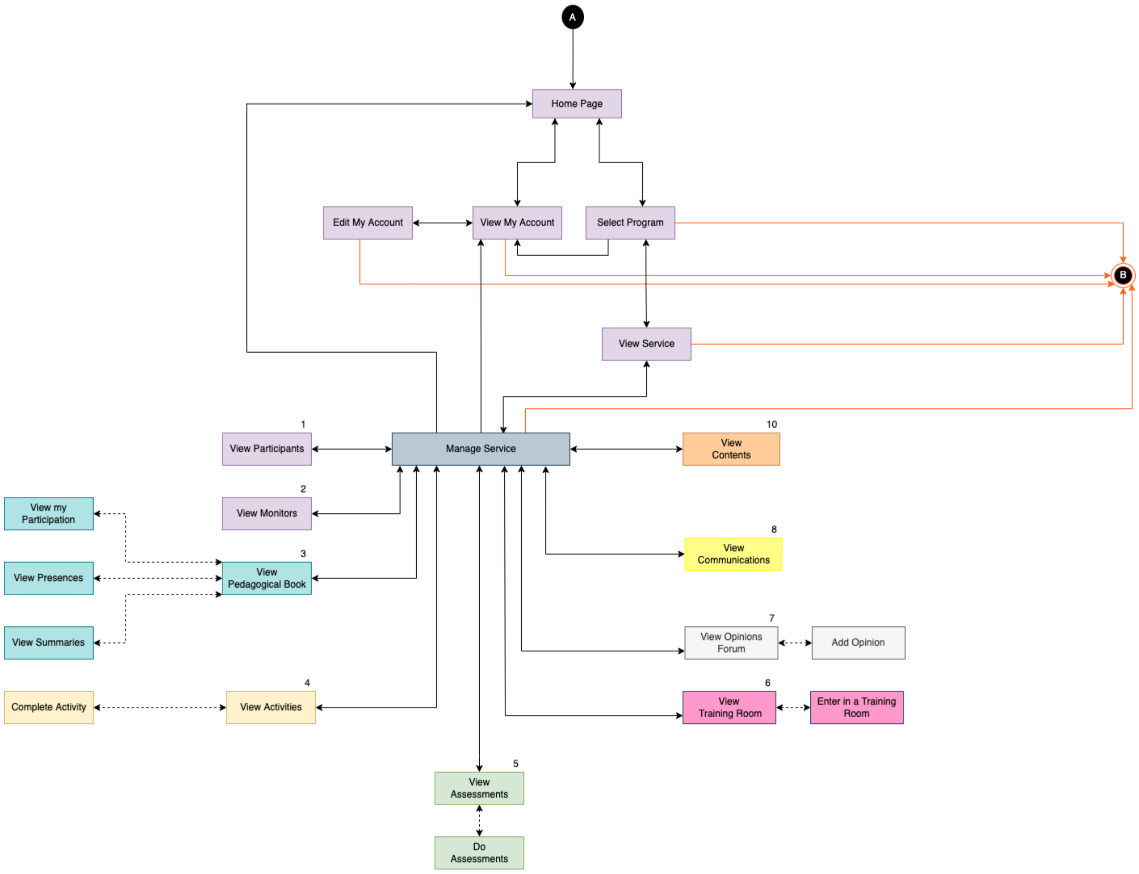


Figure 12: Participant Flow Diagram

After developing the flowcharts for the different users, the system requirements were raised to identify all the features necessary for the proper functioning of an Academy. These requirements are listed in Appendix A.

## 3.4 SYSTEM ARCHITECTURE

This section presents an approach to building the E•CVoltera system. This proposal is defined at an abstract level so that the main architectural blocks and their interactions can be easily understood. The data flow and the main transformations will be emphasized without technological commitments. Figure 13 depicts the architecture of E•CVoltera system.

### 3.4.1 *Main Classes*

Figure 14shows the Class Diagram for E.CVoltera system. As can be seen, there are nine distinct classes that will be described in the next paragraphs.

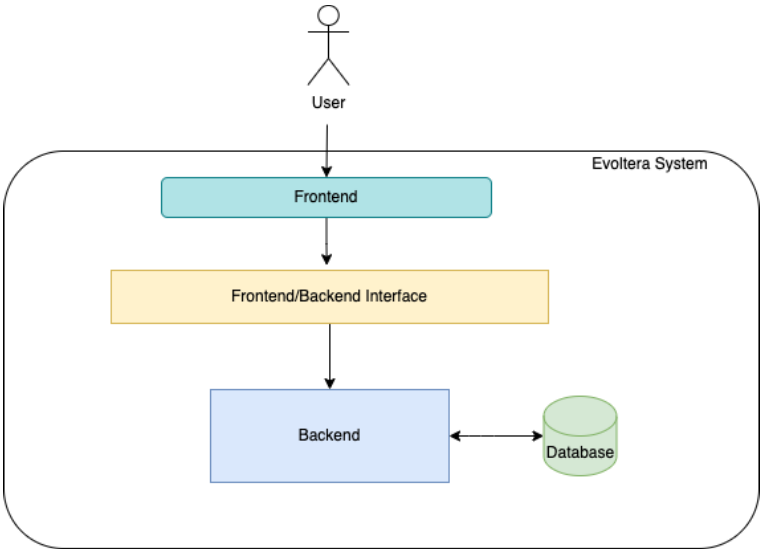


Figure 13: System Architecture

User: This entity is responsible for representing the users of the platform. A user can be enrolled in several programs just as a program has one or more users associated with it.

Program: This entity is responsible for representing some of the different courses taught by E•CV. A program has several available services.

Service: This entity is responsible for representing the different services provided by E•CV Monitors while teaching a course. A Service has several: Users, Contents, Communications, Activities, Assessments, Classifications, Training Rooms and have only one Opinion Forum and Pedagogical Book, but the Pedagogical Book, Opinion Forum, Training Room, Classification, Activity, Commutication and Content entities only belong to one Service.

Content: This entity is responsible for representing all contents added to the platform. Whenever content is added, communication is launched with the notice of its launch.

Communication:The entity is responsible for representing all communications added to the platform or launched by the system. One communication has only one content.

Activity:The entity is responsible for representing the different learning/assessment activities of the platform. There are several types of exercises, such as filling out questionnaires, the debate in small or large groups, among others. One Activity has only one communication.

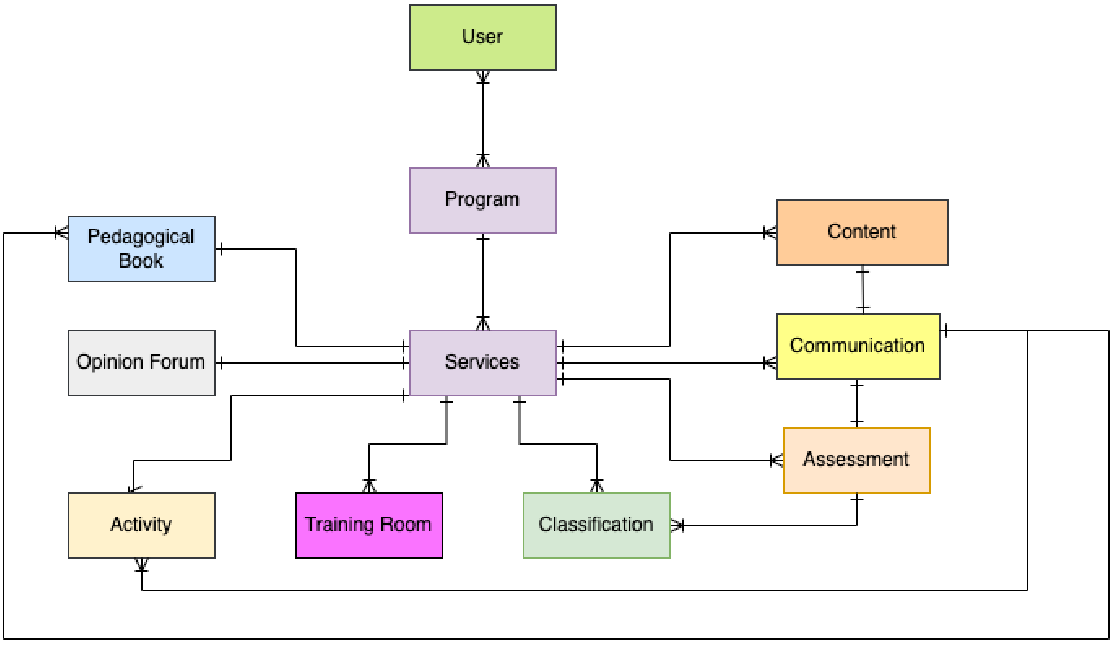


Figure 14: Entity-Relationship Model

Assessment:The entity is responsible for representing the different tests proposed to the Participants during a course for their assessment. There are several tests and these will be associated with a grading and one Test has only one communication.

Classification:The entity is responsible for representing all gradings obtained in the different exercises.

Training Room:The entity is responsible for representing the differents training rooms that can be created during a course. It is necessary for archived participants due to the purpose of the training room can have a focus on one group or for all participants.

Opinion Forum:The entity is responsible for representing the exchange of ideas/suggestions/doubts carried out by the monitors and participants associated with the program. All users can at any time add a comment on the Opinion Forum.

Pedagogical Book:The entity is responsible for representing the registration of all participations, absences, and summaries associated with the oncrete instantion of a Program. This section is intended to keep the information of all the participants of a program, as well as the record of the participants interventions and the activities that take place in the course. Whenever summarym or participation is added, communication is launched with the notice of its launch.

The Content, Communication, Assessment, Classification, Training Room, Opinion Forum and Pedagogical Book Classes correspond precisely to the options available in the main menu when the User selects the page program.

### 3.4.2 *Connected External Systems*

The main purpose of using external platforms is to make available some features required that will not be implemented directly in E•CVoltera, Instead those features will the provided by external services (that will be called) and the returned results will be incorporated into E•CVoltera from external systems.
This system needs to be integrated with a platform that allows the creation and participation in video conferences to provide the *Training Room* functionality. A possible platform to use for this requirements, Jitsi Meet.
In addition to this, the system should also be integrated with an external platform to provide automatic assessment activities from which E•CVoltera will receive information concerning the exercises automatic grading. This platform, after performing the test, should automatically calculate the rating obtained by the participant. To carry out this mapping, it is necessary to use a platform such as Qualtrics.

# 4

# E•CVOLTERA DEVELOPMENT

This chapter presents the technologies used to develop the E•CVoltera Web application backend, frontend, and database, as well as the integration of external platforms. This chapter also presents some precautions that were taken in the development of the interface, such as *the colors, layout, and graphical symbols or icons* used to make it a simple and easy application for its users.

## 4.1 technologies

In the next subsections, the tools chosen for the development of the platform are presented, Figure 15. In this presentation, the features of each tool are also as well as the reason for having been chosen.

### 4.1.1 *Backend*

As a starting point for the development of the *backend* it is necessary to study the current web development technologies, in order to understand the advantages of each one and how it is possible to create a set of versatile services that adapt to the context of use of E•CVoltera system.

In this sense, it was decided to implement the logical layer of the *backend* using *Node.js*. This was the tool chosen for being an interpreter of *Javascript*, thus simplifying communication between the *frontend* and the *backend*.

When using *Node.js*, one thing that should not be omitted is support for managing packages using the *npm* tool that comes standard with every *Node.js* installation[1]. The *npm* modules are a set of publicly available reusable components, available through easy installation via an online repository, with version and dependency management. The application server was developed in *Node.js* because it is easier to use and offers more options than other *JavaScript* servers[2]. *Node.js* is used as a single programming language, allowing writing both the

[1] https://www.npmjs.com/package/node

[2] https://nodejs.dev/learn

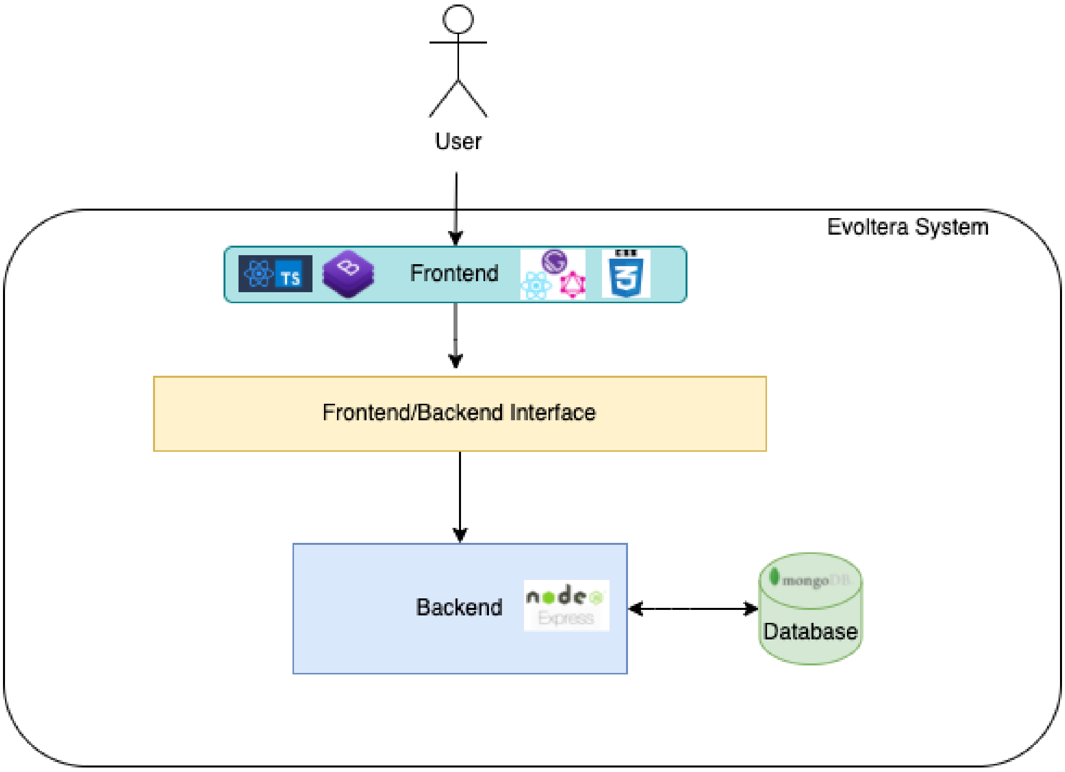


Figure 15: Tools chosen for the development

*frontend* as well as the back-end *JavaScript* web applications using a runtime environment. It also makes the deployment of web applications simpler, because almost all browsers support *JavaScript*[3].

Figure 16: *MongoDB* Logo

In addition to this common bridge between application layers, *Node.js* was chosen because it allows the construction of applications *web* fluid and optimized, prepared to provide an asynchronous response to an increasing number of simultaneous client orders. This point becomes essential due to the actual context of use where E•CVoltera platform is inserted.

Since it is necessary to persist data from different academies, monitors and participants, it was also necessary to design and implement a database. It was decided to use a non-relational database *MongoDB* chosen to facilitate interaction with external systems.

In *backend* implementation *Express*[4] framework was integrated in this module. *Express* (Figures 17) is based on the implementation of *middleware* services that respond to HTTP requests (*GET*, *PUT*, *POST*, *DELETE*, etc.) and, based on a set of predefined routes, it allows

[3] https://levelup.gitconnected.com/how-to-create-a-simple-web-app-using-javascript-d27b28459fad
[4] https://www.npmjs.com/package/express

Figure 17: *Express* Logo

defining different actions for the treatment of these requests. This framework is minimal and flexible with utility methods and HTTP middleware, that allows the creation of a robust API quickly and easily.

### 4.1.2 *Frontend*

Among the factors taken into account to choose the technology to develop the front end are the learning time and the maturation of the technology so that there are no limitations at a later stage. It also was considered its adequacy to the general architecture of the application and the technologies chosen for the development of the *back end*. The current panorama of tools and technologies for development is quite extensive and diverse, and should therefore be analyzed carefully and without prejudice.
There are three distinct parts that are usually compose a *web* application and that require the choice of different technologies.

- Logic Layer - It is responsible for all the dynamic data of the application, for example forms, dropdowns, cards, etc. The technologies for this layer were analyzed in the first place since the choices made here can influence the remaining choices. Due to the constant development of technologies, it was decided to use a JavaScript *framework*, called is React

  However, using React without any built-in management tool would be very expensive in terms of time, as everything must be done from the scratch. In this way, *GatsbyJS* was incorporated into React, thus allowing the management of the logical layer of the application and the management of routes.

- Style Layer - Layer responsible for the style issues of all page.
  For this, the Cascade Style-Sheet (CSS) language was used, being one of the most used languages for this purpose.

- Content Layer - Layer responsible for organizing the different components defined in the layout layer on the screen.React uses application separation into components, using its own HTML syntax (the technology normally used). In this way, the choice of the technology to be used for the development of this layer was more restricted. In that context, JSX technology was chosen, since it is also an extension of Javascript.

To sum up and regarding the above referred React integrated components they are (Figures 18, 19 illustrate their logos):

- React - React is a JavaScript framework used to create web interfaces. It makes use of components to create reusable modules between pages that, in addition to being able to communicate with each other, also have their own state. It was used in the context of the frontend to create this platform.
- GatsbyJS - GatsbyJS is a tool that was used in the context of the project as a management tool for React. In the frontend of the application its function is to manage all the routes, the GraphQL queries and the entire process of compiling the application.
- GraphQL - It is a query language for APIs that allow, REST to make requests for the necessary information, having been used to make static queries.

Figure 18: *React + GatsbyJS + GraphQL* Logo

- CSS - It was used to define the styles of the platform pages, including the design, layout and display variations for different devices and screen sizes.
- Bootstrap - Bootstrap is a , CSS and Javascript library that allows the use of basic visual elements necessary to build up a nice a web page. It provides all HTML interaction elements, such as buttons, writing boxes and grids.
- TypeScript - TypeScript is a JavaScript superset that lets you write code using static typing, object orientation, and makes it easy to write code with an easy-to-understand syntax.

Thus, the web application was developed using the React JavaScript library and some existing Gatsby components. To accomplish its tasks, the frontend needs to query data from different programs and services, as well as storing data received from them.

To access to any of the E.CVoltera plataform features, an user must first log into the

(a) *Bootstrap* Logo

(b) *TypeScript* Logo

Figure 19: Tools Logos

application by entering his username and password. All the platform web pages (for registration, data visualization or data editing.) make requests to the backend server to to be able to display the relevant information, the necessary validations, or data acquisitin tasks. The implementation of each of these pages is described in Section 4.3.

## 4.2 BACKEND DEVELOPMENT

In the Backend, the following layers were developed **Routers**, **Models**, and **Controllers**. **Models** define all the items(attributes) that characterize each object involved. **Controllers** help to manipulate the input data and insert it in the database in a valid/safety way. Finally, **Routers** receive in the different requests made by the frontend and redirect them to the respective controller.

Thus in the first step, different models were developed for each object involved in the system, as shown in the diagram of Figure 14. The **Model** written for the *Program* Object is listed below.

```
const mongoose = require('mongoose');
const Schema = mongoose.Schema;

let ProgramSchema = new Schema({
    Code: {type: String, required: true, unique: true},
    ProgramType: {type: String, required: true, max: 50},
    Name: {type: String, required: true, unique: true ,max: 50},
    Description: {type: String, required: true},
    Participants: {type: Array, required: false},
    Monitors: {type: Array, required: false, max:5}
});

// Export model
module.exports = mongoose.model('Program', ProgramSchema);
```

Then, **Controllers** were developed to process the input introduced by the User. Actions are sent as commands to the **Model** so that the values are mapped to the correct fields. Controllers also deal with exceptions catching them and emmiting the respective error messages.

The **Controller** developed for the *Program* Object is listed below.

```
const Program = require('../Models/Program.model');

//create program
exports.program_create = async function (p) {
    let alredyExistName = await Program.findOne({ Name: p.Name });
    let programList = await Program.find().exec();
    let codeIndex = parseInt((JSON.stringify(programList)).split('},{').length) +
     1;
    let code = p.ProgramType + '_' + codeIndex
    if(alredyExistName == null){
        let program = new Program(
            {
                Code: code,
                ProgramType: p.ProgramType,
                Name: p.Name,
                Description: p.Description
            }
        );

        program.save();

        return JSON.parse('{"status": "success", "body": "'+ code +'"}');
    }else{
        return JSON.parse('{"status": "error", "error": "Program Name already exist"}');
    }
};

//Get All Programs
module.exports.getAllPrograms = function(){
    return Program.find().exec();
}

//Get Program By Code
module.exports.getProgramByCode = async function(code){
    let p = await Program.findOne({ Code: code});

    if(p){
        return p;
    }else{
        return JSON.parse('{"status": "error", "error": "Program Does not exist with this code."}');
    }
}

//Get Program By Id
module.exports.getProgramByCode = async function(programId){
    return await Program.findOne({ _id: programId});
}

//Add Users in Program
module.exports.updateProgramUsersList = async function(id, request){
    return await Program.findByIdAndUpdate(id, request, {new:true});
}
```

Finally, the development of **Route**. Here, the different types of requests made to the database are defined, as well as the different functions used by the **Controller** to answer, or reply, the requests made by the user.

Next, the **Route** writen for the *Program* Object is listed below.

```
var express = require('express');
const router = express.Router();
const program_controller = require('../Controllers/Program.controller');

//create program
router.post('/', function(req,res){
    program_controller.program_create(req.body)
        .then(dados => res.jsonp(dados))
        .catch(e => res.jsonp(e))
});

//Get Program by code
router.get('/:code', function(req, res){
    program_controller.getProgramByCode(req.params.code)
      .then(data => res.status(200).jsonp(data))
      .catch(err => res.status(500).jsonp(err))
  })

//Get All Programs
router.get('/', function(req, res){
  program_controller.getAllPrograms()
    .then(data => res.status(200).jsonp(data))
    .catch(err => res.status(500).jsonp(err))
})

//Get Program by Id
router.get('/:id', function(req, res){
  program_controller.getAllPrograms(req.params.code)
    .then(data => res.status(200).jsonp(data))
    .catch(err => res.status(500).jsonp(err))
})

// Changes Program Parameters
router.put('/:id', function(req, res){
  program_controller.updateProgramUsersList(req.params.id, req.body)
    .then(data => res.status(200).jsonp(data))
    .catch(err => res.status(500).jsonp(err))
})

module.exports = router;
```

This last module is linked to the main **Backend** file, called **App.js**. This file defines the connection to the database as well as the different routes used by the **Backend** to respond to the different requests made by the user.

### 4.2.1 *Authentication*

The most crucial point of the backend was the issue associated with the storage of user passwords. In order to encrypt the passwords before being saved in the database, the 'bcrypt' library of Node.js was used. This module was useful because it already has the standard function to generate a salt and a hash in separate function calls and to encrypt the input text with the generated salt. In addition to this, this library also has already defined compare functions, facilitating the password update functionality.

```
var salt =  await bcrypt.genSalt(10);
user.Password =  bcrypt.hashSync(user.Password, salt);

user.save();
```

So the password for the database looks like this, this text is already the encrypted password entered::

```
Password: \$2b\$10\$v.MhOfQl1548Dsea1v8r7OmGHOvh/Oy6a.ovNTM1dl50yU3V3xElO
```

### 4.2.2 *Log In*

The JWT is a JSON object (Stauffer, 2019) that contains the information necessary to determine access permissions as well as user access information.

This allows only the server that knows the 'secret' to validate the contents of the token and thus confirm the user's authentication. The token is not "encrypted", but "signed", so that only the signature key can be proven, which prevents attackers from “creating” tokens on their own.

In this way, JWT was used to validatethe login of different users, as illustrated in the listing below:

```
    var isValidPass = await bcrypt.compareSync(request.Password, a.Password);

    if(isValidPass){
        var token = jwt.sign({user : a}, 'evoltera', {expiresIn: 300});
        return JSON.parse('{"status": "success", "auth": "true", "token": "'+
token+'"}');
    }
    else return JSON.parse('{"status": "error", "error": "Password"}');
```

## 4.3 FRONTEND DEVELOPMENT

As a starting point, it was decided to implement the feature described in requirement 84, listed in Appendix B, concerning the system multi-language capability.

To develop this part, the gatsby package *gatsby-plugin-intl*. This package helps to use different URLs per page, one for each language [5]. Even using that Gatsby package, the implementation was not straight-forward, and some difficulties were found..

To overcome the referred difficulties was decided to place a validation on each page developed for the window it received to build/load it. When the window came with a value other than 'undefined' it would already be possible to develop it. So the error stopped occurring.

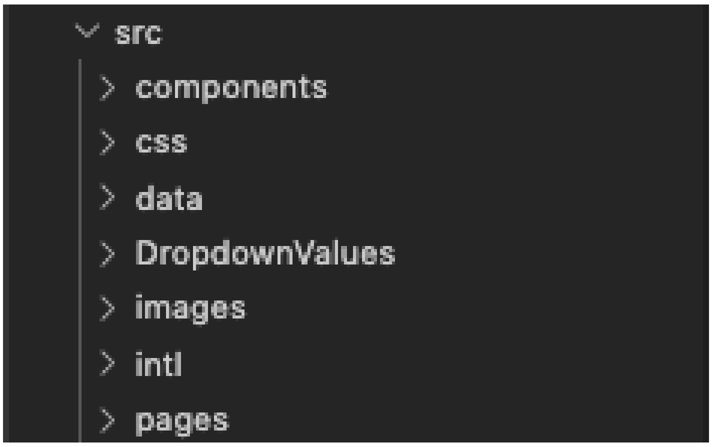
The second development decision was to port all the already exhisting software to a departmental webserver ('epl-di.uminho.pt') in order to make the platform accessible since the beginning. o realize that development decision (that proved to be crucial in the last step, the deployment phase) the system was setup to run on port 50000, using a parametrization like "start": **"start": "PORT=50000 npm run develop"**

After installing the application on the webserver, the other webpages were developed having always in mind their usability aiming at offering the users an intuitive interaction. The organization of the information and menu buttons in the window, the location of each data item on the screen, the colos used, the warning or error messages are issues that must be cared to assure an user-friendlyness interface.

To facilitate the development, the project directory was organized in the folders shown in Figure 20:

[5] https://www.npmjs.com/package/gatsby-plugin-intl

- **Components :** This folder contains the components that are used in the platform, from dropdowns to the Alert messages. For each folder there is a *.js* and a *.css* file where the logic and appearance of each component are defined.
- **CSS :** This folder are all the files that define the appearance of each page;
- **Data :** In this folder are the different orders that are made by the user and the different actions performed.
- **Images :** In this folder, stay all static images of the application are stored.
- **Intl :** This folder contains the dictionaries used to support the multi-languages feature.
- **Pages :** This folder stores all the pages developed for the platform.



```
∨ src
  > components
  > css
  > data
  > DropdownValues
  > images
  > intl
  > pages
```

Figure 20: Project Organization

All common components that are used in the different pages are imported from the corresponding folder inserted in the Components.

As previously said, different pages exhibit the same Header and Footer to maintain consistency across all platform pages. Below, the codebase snippet for developing a page is listed:

```
class PageName extends React.Component<any,any> {
  constructor(props: any, context: any) {
        super(props, context);

        this.state = {
            //diferents Variables for page informations
        };
    }

    public componentDidMount() {
        //get all values for diferents variables from database
    }

    public render() {
    return(
        <form>
          {isBrowser ? (
            <Layout location={location.pathname}>
               //divs informations
            </Layout>
          ):null}
        </form>
      );
    }
}

export default PageName;
```

The *Layout* component listed below defines the layout of the pages Header and Footer.

```
const renderFactory = (children: React.ReactChildren) => (data: any) => (
  <div>
    <Header siteTitle={data.site.siteMetadata?.title || ‘Title‘} />
      <div>
        <main style={{
            margin: ‘0 auto‘,
          }}>{children}</main>
      </div>
    <Footer/>
  </div>
);
```

After defining the basic layout of a page, the remaining components of each page were developed according to its purpose. Every item concerned with the visual aspect and appearance of a page is defined in detailed in the associated *CSS* file that is imported into the page.
Below an example of a *CSS* component for a *Grid* is listed.

```
 .littleButonGrid{
    display: grid;
    grid-template-columns: repeat(2, 1fr);
    grid-column-gap: 3px;
    grid-row-gap: 1em;
  }

 .searchBoxSec{
    margin-top: 140px;
    margin-left: 120px;
}
```

Each of these components is called inside a *<div>* element. In the following listing a *grid* with 2 columns is defined.

```
<div className="littleButonGrid">
    <div>
        <p>{TEXT}</p>
    </div>
    <div>
        <input className="searchBoxSec" type="text" ... />
    </div>
</div>
```

Most of the pages were based on the same design principle presented so far.
Another challenge faced during the development was the the implementation of the features for uploading and downloading documents. Each document has an associated service and activity.
For the records registration, the base definition of the page was changed. In this case, we extract the action you want to perform and define the URL for which we intend to place the order.

```
    public render() {
        apiUrl = 'http://127.0.0.1:50001' + "/upload/"+this.state.services._id+'/
    '+this.state.activity._id+'/'+serList+'/'+actList;

        return(
            <form method="post" encType="multipart/form-data" action={(apiUrl)}>
              {isBrowser && (
                <Layout location={location.pathname}>
                //Page information
                </Layout>
              )}
```

```
                </form>
            );
        }
    }
```

The rest of the registration logic at the database level is the same as the other pages explained above.

To implement the Download functionality, the same logic was used at the front-end level. Regarding the back-end, it was necessary, in response, to send the document content. The information sent in the get request is already downloaded as illustrated below:

```
router.get('/:id', function(req, res){
  file_controller.getFileById(req.params.id)
    .then(data => res.status(200).download(JSON.parse(data.name).path, JSON.parse(data.name).originalname))
    .catch(err => res.status(500).jsonp(err))
});
```

This logic is applied to one document at a time. When documents are listed to the user, a Download button is associated with ach one. Selecting this action, the document id is sent in order to get the Document requested, and the information contained in the document is returned.

After finishing the implementation of the features related to documents handling, the functionalities concerned with the registration of attendance and participation in a sessions were implemented.

For this, an extra component was developed to mark the presence/participation of a user by selecting the option **'Present'** or **'Absent'**.

After selecting the required option, the association is stored in a list with the participant's identification and his attendance status. the *JSON* record created for each user is listed below:

```
    const elem = {
        participantId: participantId,
        participantNumber: participantNumber,
        presente: presence,
        sessionId: sessionId._id
    }
```

After selecting whether the participant is **'Present'** or **'Absent'**, the list with the different *JSONs* is recorded in the database.

Finally, to make it easier to control who was or was not present/participated or not in a session the action of being able to take a screenshot of previously registered presences was developed.

Initially, a table was developed to organize and show the information about the presence of different users in a section. For this functionality, one more extra component was developed to be used both for listing Attendances and Participations. In the development of this table, the components *MDBTable, MDBTableBody, MDBTableHead* already existing in *react* were used and are illustrated in the listing below.

```
export default function ({listRows}){
  var finalList = [];

  listRows.forEach(function (value) {
    finalList.push({
        'Number': value.ParticipantNumber,
        'Status': value.Presence,
        'Assinatura': ' '
      });
    })

    var data_checkboxes = {
      columns: [
        {
          'label': <p className="titleLetters">{translate('numberUser')}</p>,
          'field': 'Number',
          'sort': 'asc'
        },
        {
          'label': <p className="titleLetters">{translate('userStatus')}</p>,
          'field': 'Text'
        },
        {
          'label': <p className="titleLetters">{translate('assinatura')}</p>,
          'field': 'Text'
        }
      ],
      rows: listRows};

    return(
      <div className={'tableGrid'}>
          <MDBTable btn fixed>
            <MDBTableHead columns={data_checkboxes.columns} />
            <MDBTableBody rows={data_checkboxes.rows} />
            </MDBTable>
        </div>
    );
}
```

The table receives the list of attendances/participations and lists them in an organized way in order to be easy for the user to read. When the user is on the page with the table relating to attendance/attendance, he also has the option to Print that table.
To implment this functionality when the user selects the Print option, the program takes a print of the current page and prints the table.

```
    <button
        className="buttonPresencesPrintTabe"
        type="button"
        value="backtoPage"
        onClick={() => window.print()}
    >
        {translate("print")}
    </button>
```

# 5

# E•CVOLTERA, A GUIDED TOUR

This Chapter shows all the features available for the Admin, Monitor and Participant. Initially the layout used for all pages is shown and explained how it works, as well as some common features for all these users are introduced. In the following sections, other specific features for each user are presented.

## 5.1 HEADER LAYOUT

As mentioned before, all pages contain a specific header and footer. The header will show different actions according to whether the user is logged into the platform or not. The footer maintains its appearance on every page of the platform.
Regarding the Header, it has two areas. On the left there is always a button with the platform's name; the associated action is a link that brings the user to his homepage. On the right there is a subarea context dependent with two or more buttons. That are context dependents When the user is not yet logged in, Figure 21, only 2 buttons appear on the right side the Login and Contacts , that give access to the login page or to the contacts page. This last page is a direct link to the contact page of the E•CV website.

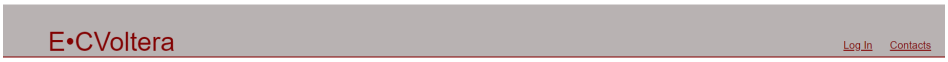


Figure 21: E•CVoltera Initial Header

When the user is already logged in the platform, Figure 22, then 2 buttons appear on the right side of the Header: 'My Account' and Logout. 'My Account' action is explained in section 5.4. Regarding Logout action, it closes the user's private account, returning to the initial header.

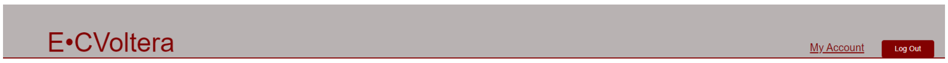


Figure 22: E•CVoltera Second Header

## 5.2 FOOTER LAYOUT

It has always the same appearance/composition regardless of whether the user is logged in or not, Figure 23. The Footer exhibits on the left side the option of the lanyard that the page will have, in the middle the E•CV logo, and on its right side a link to the official E•CV website.

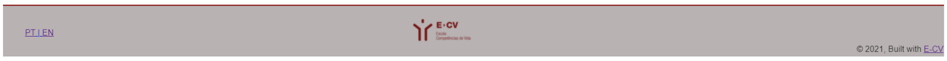


Figure 23: E•CVoltera Footer

## 5.3 LOGIN ACTION

The Login page, Figure 24, is the page where the web application starts. This page has a simple interface with the request for credentials (Username and password), and an image that identifies the E•CV.

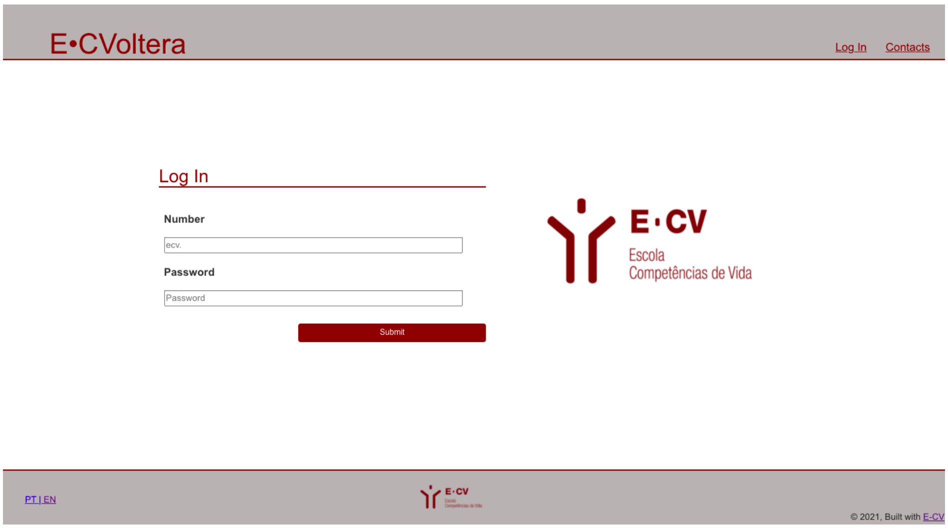
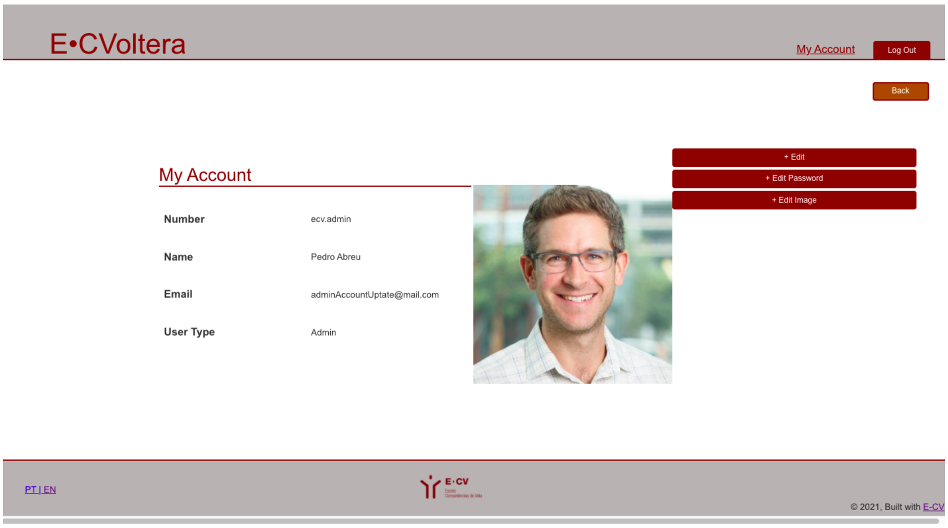


Figure 24: E•CVoltera Login Page

## 5.4 MY ACCOUNT FUNCTIONALITIES

All the users that logged in the platform successfully have access to the 'My Account' page. In this page the user can see all infomations associated to him. The flow in Admin view is showed in this section, but the application behavior for Participants and Monitors follows the same logic.
As Admin, the user can perform the following actions:

- Edit
- Edit Password
- Edit Image



My Account

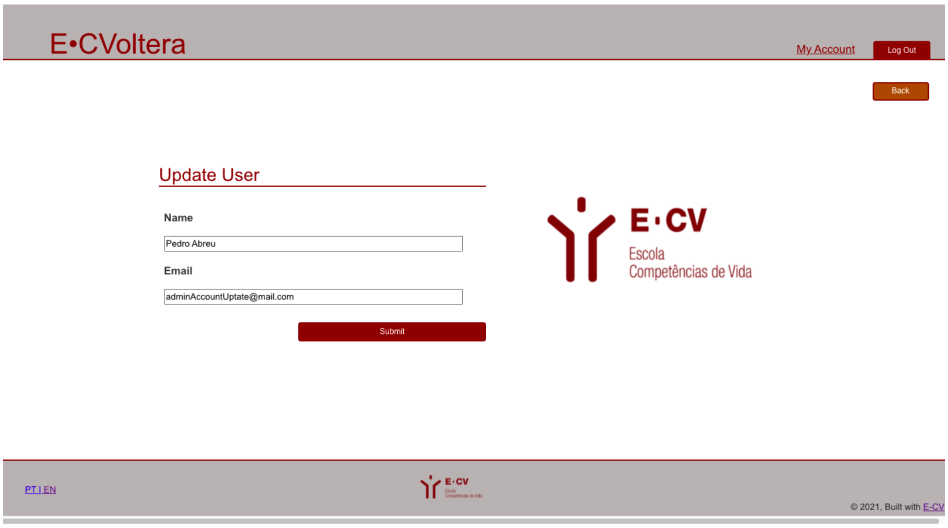
| | |
|---|---|
| Number | ecv.admin |
| Name | Pedro Abreu |
| Email | adminAccountUptate@mail.com |
| User Type | Admin |

Figure 25: E•CVoltera My Account Admin Page

Any of these actions will be used to edit the identification items associated with the logged-in user. The purpose of each of these actions is explained in the section 5.4.1, section 5.4.2 and section 5.4.3.

### 5.4.1 *Edit Action*

If select the 'Edit' option, the admin can update his 'name' or 'email. Figure 26 shows the Edit Account Page.
For each information that can be edited, a text box is displayed where the new value that will be associated with each parameter can be inserted. Fields not updated will keep the original value.
Since the Admin does not have an associated contact, he can only edit his Name (notice that



Update User

Name

Pedro Abreu

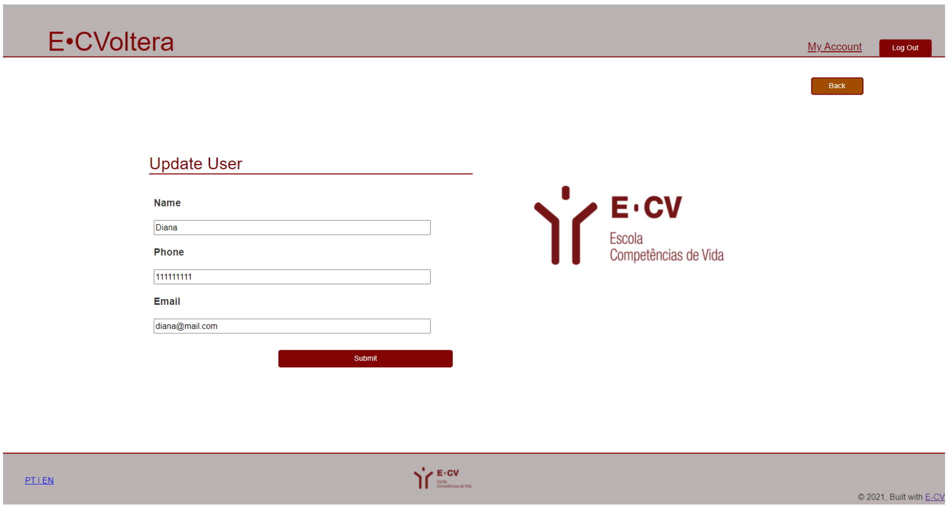
Email

adminAccountUptate@mail.com

Submit

Figure 26: E•CVoltera Edit My Account Page

Name an Username are different concepts and have different values), or his Email. In case of a Participant or Monitor, the user can edit these previous fields plus the Phone number, Figure 27.



Update User

Name

Diana

Phone

111111111

Email

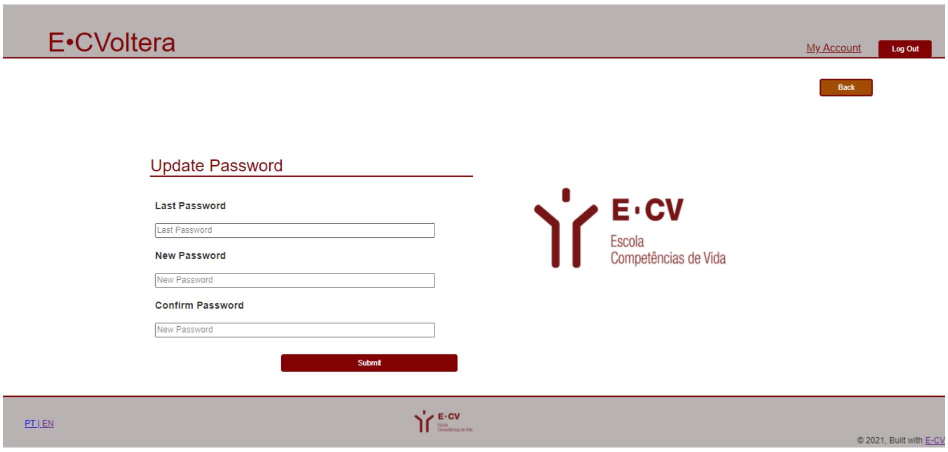
diana@mail.com

Submit

Figure 27: E•CVoltera Edit My Account Page (Monitor and Participant)

### 5.4.2 *Edit Password Action*

If select the 'Edit Password' option, the Admin can update his password. Figure 28 shows the Edit Password Page.



Update Password

Last Password

Last Password

New Password

New Password

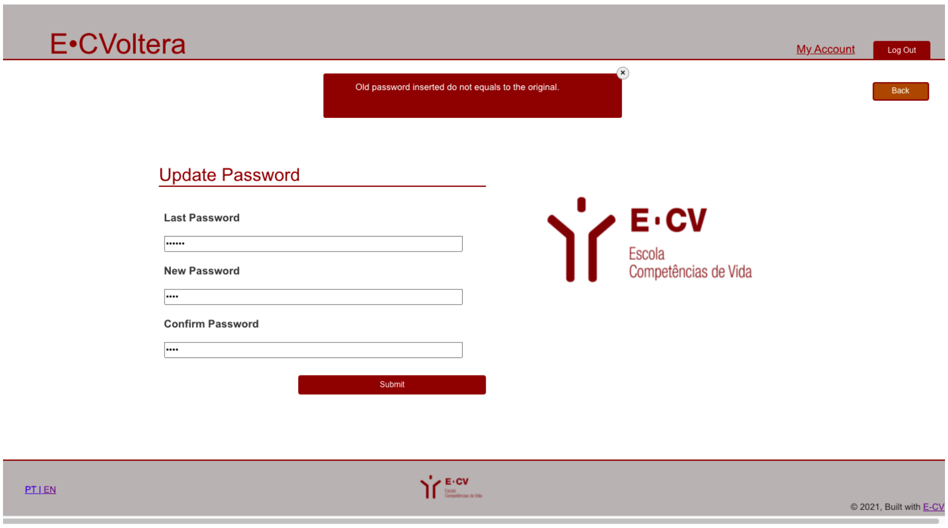
Confirm Password

New Password

Figure 28: E•CVoltera Edit Password Page

In order to update the password, it is necessary to enter the previously associated password. After validation that the previous password is correct then the user's password is updated with the new password entered.

In case the old password entered is not correct, an error message is displayed, see Figure 29. A validation is also done for the new password and confirmation, and the error message is changed to the error in tat case.



Old password inserted do not equals to the original.

Update Password

Last Password

••••••

New Password

••••

Confirm Password

••••

Figure 29: E•CVoltera Error message

### 5.4.3 *Edit Image Action*

If select the 'Edit Image' option, the admin can update his own Image. Figure 30 shows the Edit User Image Page.
In this action, a popup is opened so that the user can select an image file exhisting in his computer. This image will, after selecting 'Submit', be stored in the database associated with the current user.

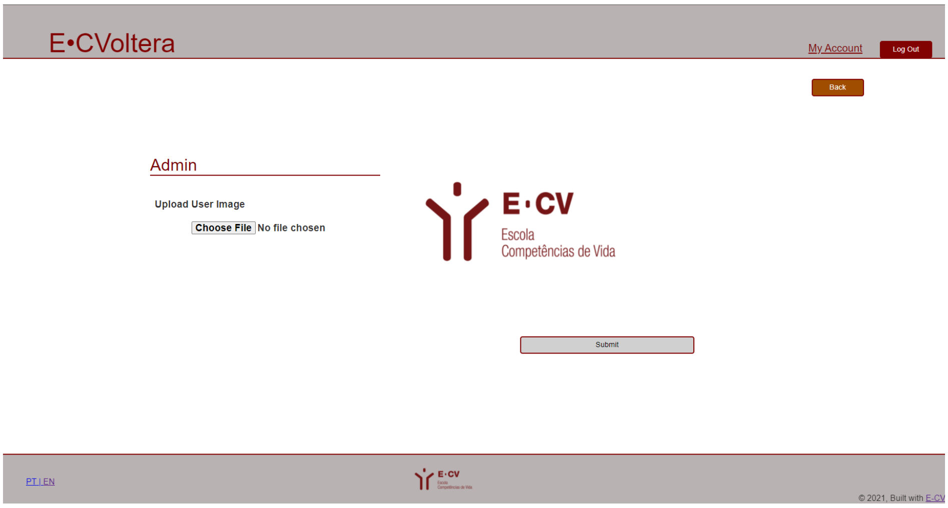
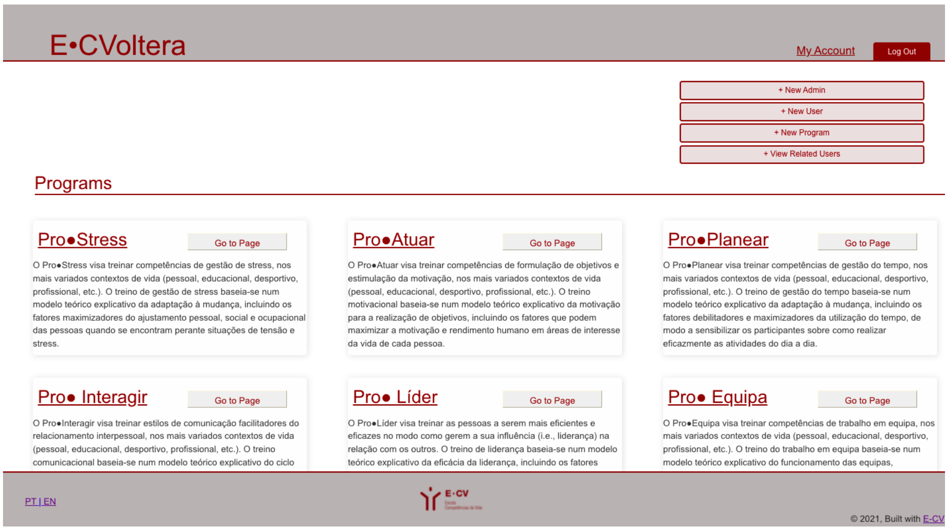


Figure 30: E•CVoltera Edit Image Page

## 5.5 ADMIN EXPERIENCE



O Pro●Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

O Pro●Atuar visa treinar competências de formulação de objetivos e estimulação da motivação, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino motivacional baseia-se num modelo teórico explicativo da motivação para a realização de objetivos, incluindo os fatores que podem maximizar a motivação e rendimento humano em áreas de interesse da vida de cada pessoa.

O Pro●Planear visa treinar competências de gestão do tempo, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão do tempo baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores debilitadores e maximizadores da utilização do tempo, de modo a sensibilizar os participantes sobre como realizar eficazmente as atividades do dia a dia.

O Pro●Interagir visa treinar estilos de comunicação facilitadores do relacionamento interpessoal, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino comunicacional baseia-se num modelo teórico explicativo do ciclo

O Pro●Líder visa treinar as pessoas a serem mais eficientes e eficazes no modo como gerem a sua influência (i.e., liderança) na relação com os outros. O treino de liderança baseia-se num modelo teórico explicativo da eficácia da liderança, incluindo os fatores

O Pro●Equipa visa treinar competências de trabalho em equipa, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino do trabalho em equipa baseia-se num modelo teórico explicativo do funcionamento das equipas,

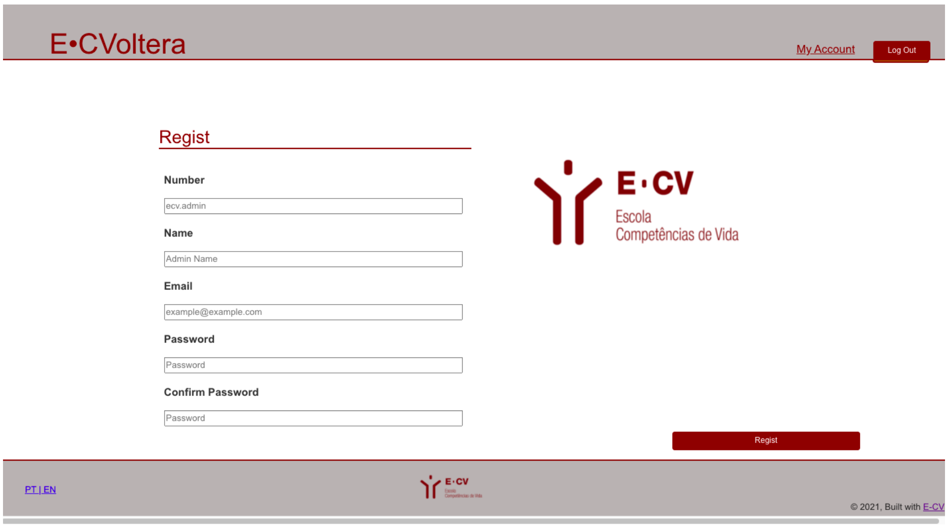
Figure 31: E•CVoltera Admin Home Page

The Admin Homepage, Figure 54, exhibits in the middle part of the window all **Programs** registered until now, and on the top right corner a menu with the following options:

- New Admin
- New User
- New Program
- View Related Users
- Go to the Program Page

### 5.5.1 *New Admin*

If user selects the 'New Admin' option, the Admin can create a new Admin User. Figure 32 shows the Form related to Admin register.
This page asks for all the fields needed to register a new Admin. All fields requested are mandatory for Admin registration.



Regist

Number
ecv.admin

Name
Admin Name

Email
example@example.com

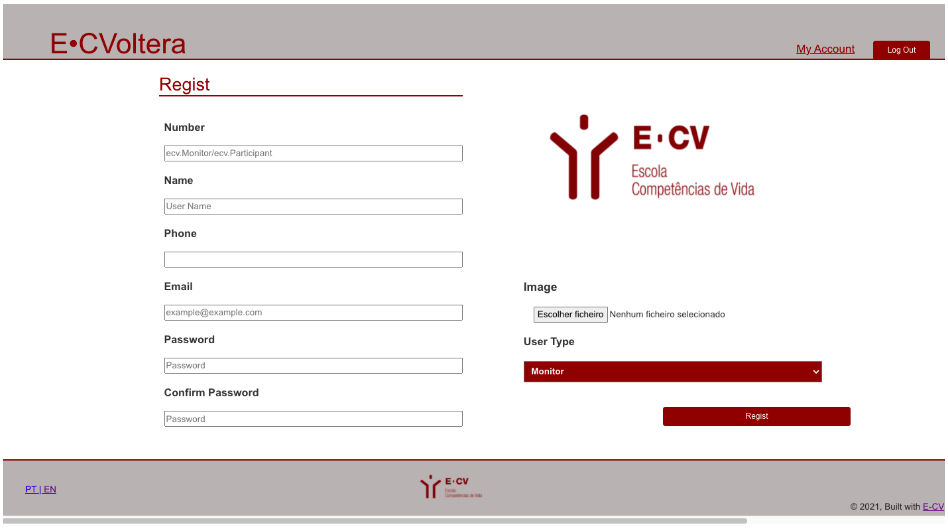
Password
Password

Confirm Password
Password

Figure 32: E•CVoltera Create Admin Page

### 5.5.2 *New User*

If user selects the 'New User' option, the Admin can create a new user with one of the roles Monitor or Participant. Figure 33 shows the Form related to Monitor or Participant register. This page allows to fulfill all the fields needed to register a new user. All these fields requested are mandatory for user registration. The default user type is associated with Monitor value. But the administrator can edit this parameter by selecting another existing value in the dropdown. This Form also has a filed to chose a image file to complete tehe user's record with a photo.



Regist

Number
ecv.Monitor/ecv.Participant

Name
User Name

Phone

Email
example@example.com

Password
Password

Confirm Password
Password

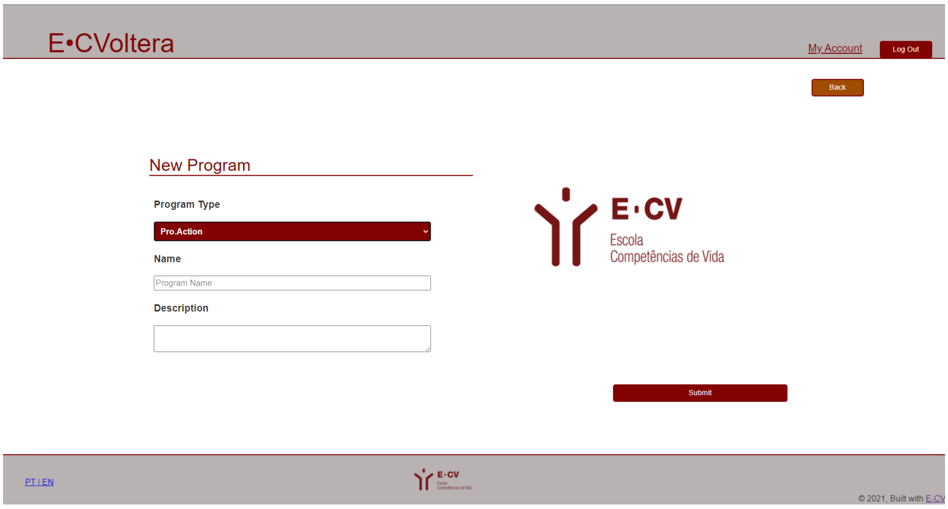
Image
Nenhum ficheiro selecionado

User Type
Monitor

Figure 33: E•CVoltera Create a new User Page

### 5.5.3 *New Program*

If user selects the 'New Program' option, the admin can add a new Program to the platform. Figure 34 shows the Form related to Program register.



E•CVoltera

New Program

Program Type: Pro.Action

Name: Program Name

Description:

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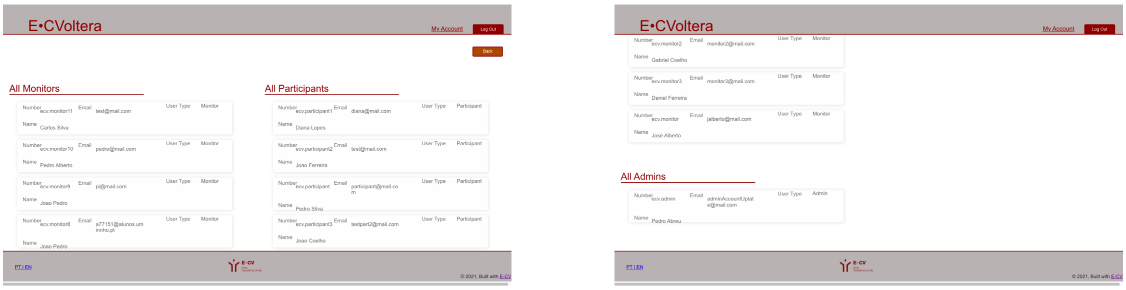
Figure 34: E•CVoltera Create a new Program Page

In this case, the value associated with the type of program is by default is 'Pro.Atuar'; however it is possible to edit this value by selecting another one available in the dropdown.

### 5.5.4 *View Related Users*

If user selects the 'View Related Users' option, the admin can see all Users registred in platform. Figure 35 shows a Grid listing All registred Users.

This grid presents 3 different lists: Admins, Monitors and Participants. For each user registered in the database, his username, associated email, and type are presented.



E•CVoltera

All Monitors

| Number | Email | User Type | Name |
|---|---|---|---|
| ecv.monitor11 | test@mail.com | Monitor | Carlos Silva |
| ecv.monitor10 | pedro@mail.com | Monitor | Pedro Alberto |
| ecv.monitor9 | pi@mail.com | Monitor | Joao Pedro |
| ecv.monitor8 | a77151@alunos.uminnho.pt | Monitor | Joao Pedro |
| ecv.monitor2 | monitor2@mail.com | Monitor | Gabriel Coelho |
| ecv.monitor3 | monitor3@mail.com | Monitor | Daniel Ferreira |
| ecv.monitor | jalberto@mail.com | Monitor | José Alberto |

All Participants

| Number | Email | User Type | Name |
|---|---|---|---|
| ecv.participant1 | diana@mail.com | Participant | Diana Lopes |
| ecv.participant2 | test@mail.com | Participant | Joao Ferreira |
| ecv.participant | participant@mail.com | Participant | Pedro Silva |
| ecv.participant3 | testpart2@mail.com | Participant | Joao Coelho |

All Admins

| Number | Email | User Type | Name |
|---|---|---|---|
| ecv.admin | adminAccountUptate@mail.com | Admin | Pedro Abreu |

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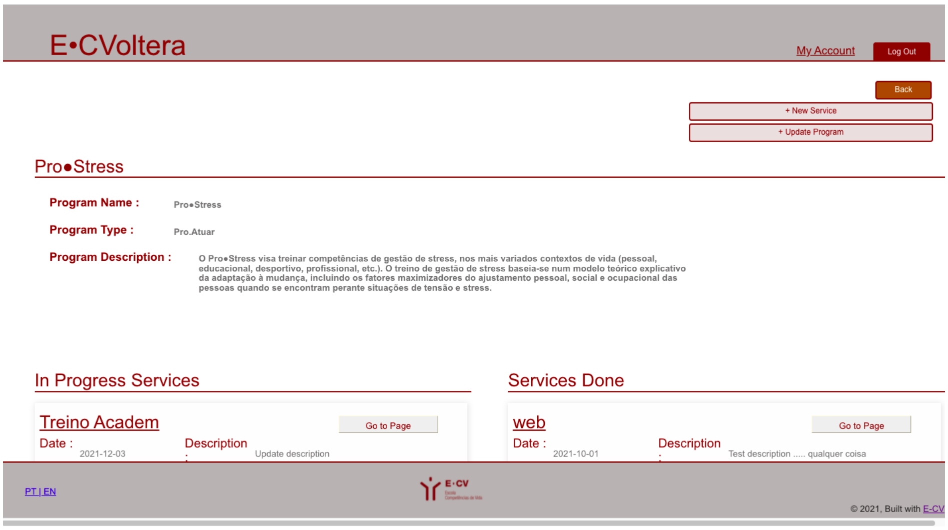
Figure 35: E•CVoltera All User Grid

When a user clicks on the Program Name he goes to the Program page, Figure 36.



E•CVoltera

Pro●Stress

**Program Name :** Pro●Stress

**Program Type :** Pro.Atuar

**Program Description :** O Pro●Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

In Progress Services

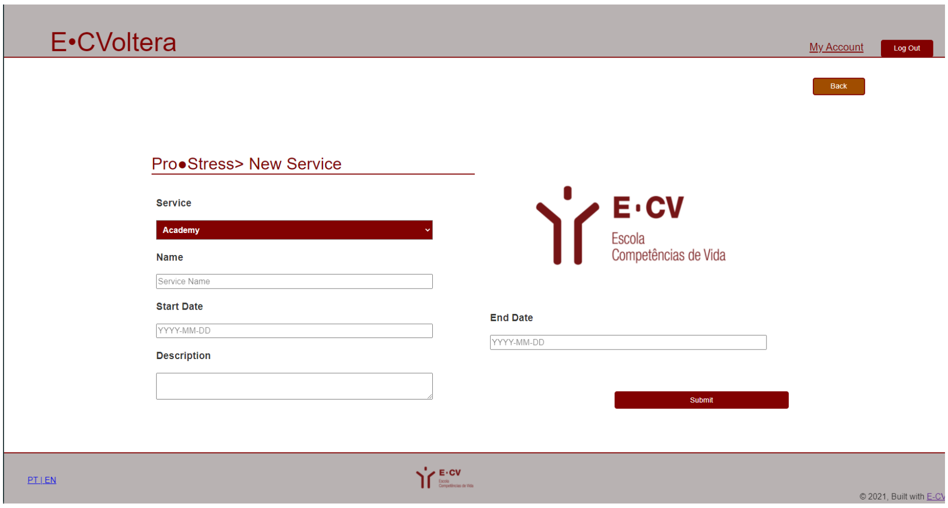
Treino Academ
Date : 2021-12-03
Description : Update description

Services Done

web
Date : 2021-10-01
Description : Test description ..... qualquer coisa

Figure 36: E•CVoltera Program Page

In this page, he can see all information related to the program selected; moreover the user can also choose 2 options 'New Service' or 'Edit Program'. Selecting the first option, the user is moved to the New Service Form, Figure 37.
'New Service' page allows the user to create a new service.
For the creation of a service, it is necessary to fulfill the fields that compose the register of a Service, which appear in the screen, as illustrate in Figure 37. The service type is filled through a dropdown, and the default value is set to 'Academy'.



E•CVoltera

Pro●Stress> New Service

Service: Academy

Name: Service Name

Start Date: YYYY-MM-DD

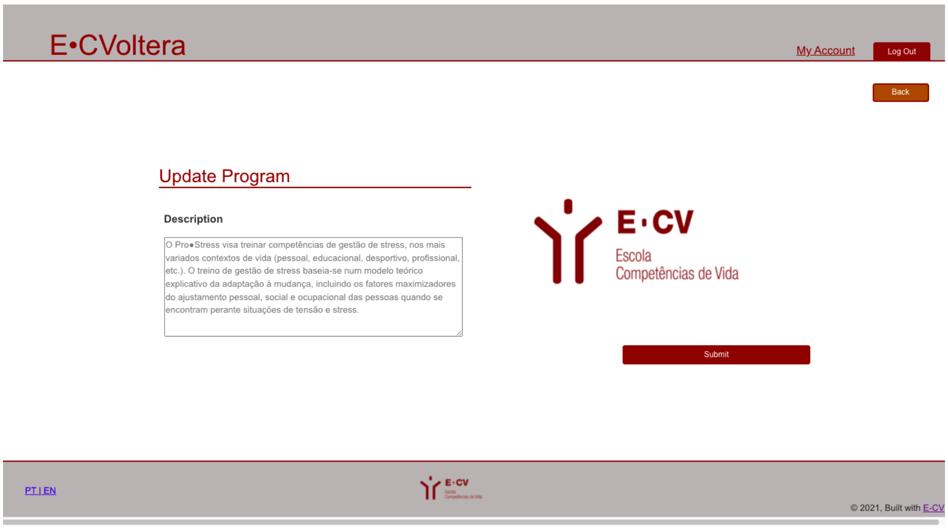
Description:

End Date: YYYY-MM-DD

Figure 37: E•CVoltera Create Service Form

'Edit Program' page allows the user to edit the Description of the Program selected, as illustrated in Figure 38.

The only field that can be edited is the description. If for some reason the user has gone to this page and does not wish to edit the Program Description, he can select the 'Back' button on the top right corner of the central window. All platform pages except the Homepage contain this button to return adandoning the page without performing any action (a kind of 'cancel' button).



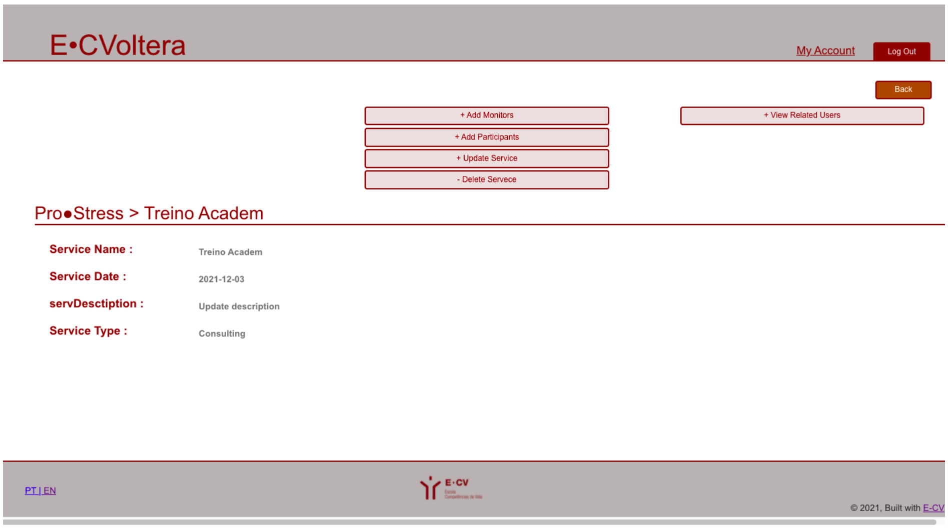
Update Program

Description

O Pro●Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

Figure 38: E•CVoltera Edit Service Form

When a user clicks on the service name in service listed in Program Page, Figure 36, he goes to the service page, Figure 39.



Pro●Stress > Treino Academ

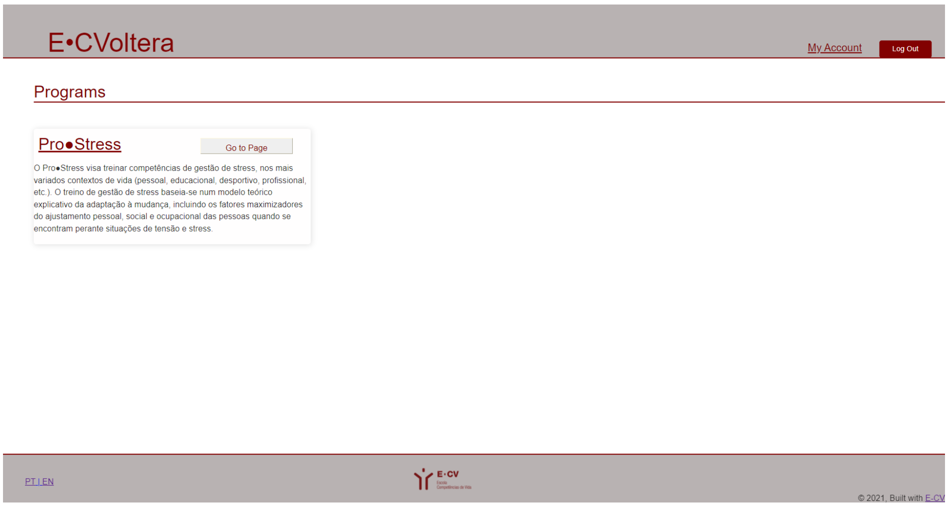
| | |
|---|---|
| Service Name : | Treino Academ |
| Service Date : | 2021-12-03 |
| servDesctiption : | Update description |
| Service Type : | Consulting |

Figure 39: E•CVoltera Service Page

Figure 51 below exhibits the various forms and pages for Admin to manage the Services. Regarding the 'Service Editing', page (Figure 51c), it is only possible to edit its description, as explained above regarding the edition of Program Description to edit the program. In the page that shows Service Related Users (Figure 51d) the basilar information about Monitors and Participants enrolled in the Service selected is displayed.

On the pages to add Monitors and Participants, different search bars are displayed where, when we search for a user, the available participants or monitors will appear. When the desired user is found it can be selected and later added to the Service. On the Add Participants page, the number of existing search bars will vary with the type of service.

## 5.6 MONITOR EXPERIENCE



Programs

Pro●Stress

O Pro●Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

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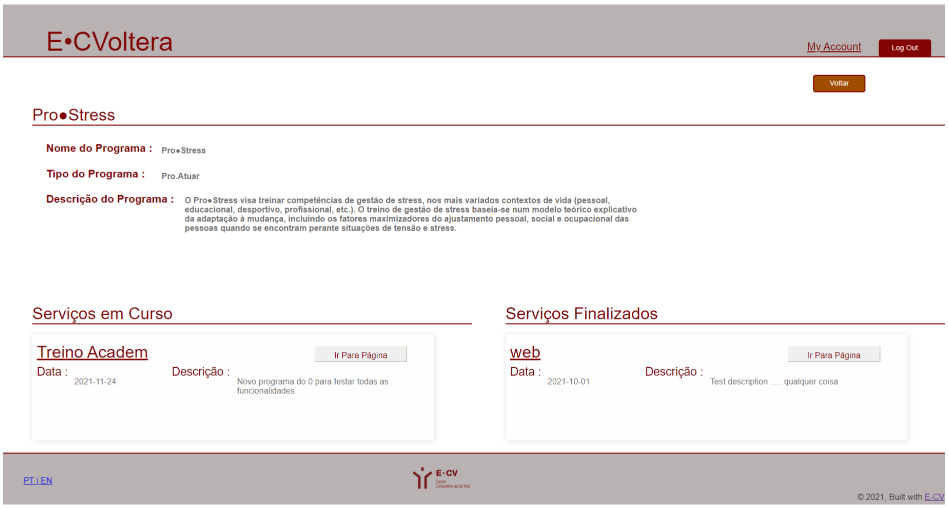
Figure 40: E•CVoltera Monitor Home Page

As a Monitor his Homepage, Figure 40, shows all **Programs** associated to him. In this page, the user can select one out of three buttons: 'My account' page, Program page or LogOut.



Pro●Stress

Nome do Programa : Pro●Stress

Tipo do Programa : Pro.Atuar

Descrição do Programa : O Pro●Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

Serviços em Curso

Treino Academ

Data : 2021-11-24

Descrição : Novo programa do 0 para testar todas as funcionalidades.

Serviços Finalizados

web

Data : 2021-10-01

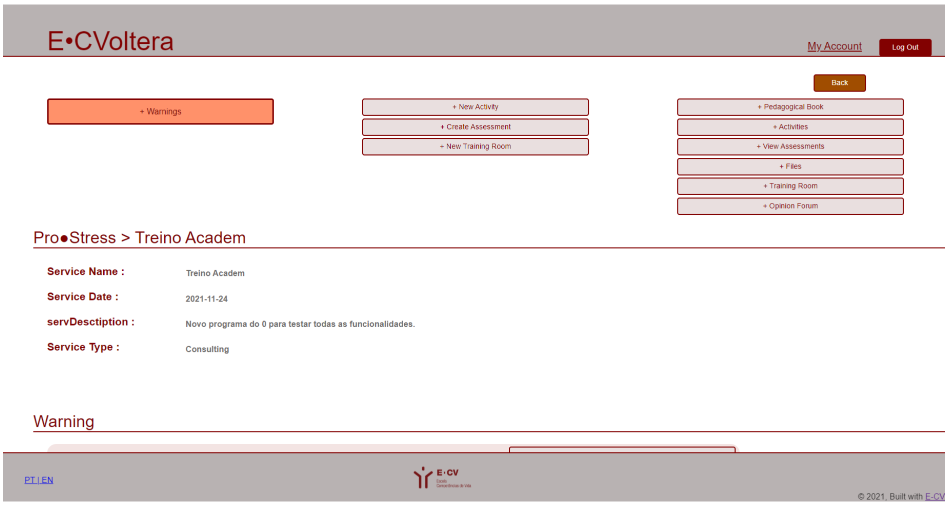
Descrição : Test description ..... qualquer coisa

© 2021, Built with E-CV

Figure 41: E•CVoltera Program Page

When the user clicks on the Program name or in the button near to the name he goes to the Program page, Figure 41.

On this page, he can see all information related to the program and can go to the Service to the program. When select the service he moves to the Service page, Figure 42.



Pro●Stress > Treino Academ

**Service Name :** Treino Academ

**Service Date :** 2021-11-24

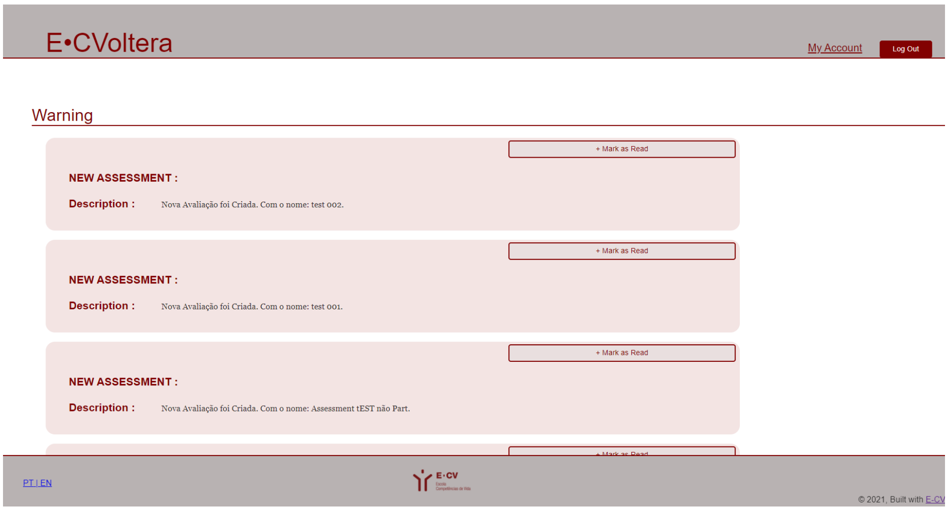
**servDesctiption :** Novo programa do 0 para testar todas as funcionalidades.

**Service Type :** Consulting

Warning

Figure 42: E•CVoltera Service Page

In the service page, the information related to this Service record is displayed in the middle part of the central window; in the top of that window a multi-column menu provides access to , create new activities, assessments and training rooms among other actions.



Warning

**NEW ASSESSMENT :**

**Description :** Nova Avaliação foi Criada. Com o nome: test 002.

**NEW ASSESSMENT :**

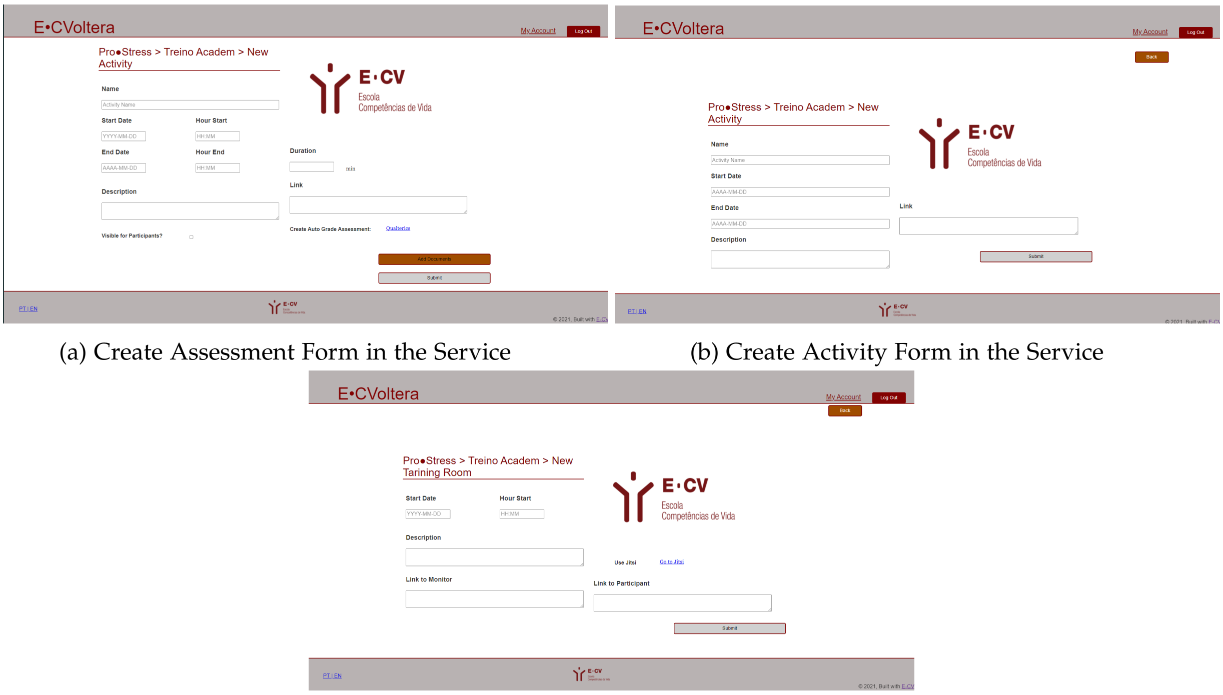
**Description :** Nova Avaliação foi Criada. Com o nome: test 001.

**NEW ASSESSMENT :**

**Description :** Nova Avaliação foi Criada. Com o nome: Assessment tEST não Part.

Figure 43: E•CVoltera Warnings List in Service Page

In the bottom part of the central window a list of Warnings will appear, as shown in Figure 43, to inform the Monitor about the most recently created components (assessments, etc.). The idea is to make the Monitor work easier.



(a) Create Assessment Form in the Service

(b) Create Activity Form in the Service

(c) Create Training Room Form in the Service

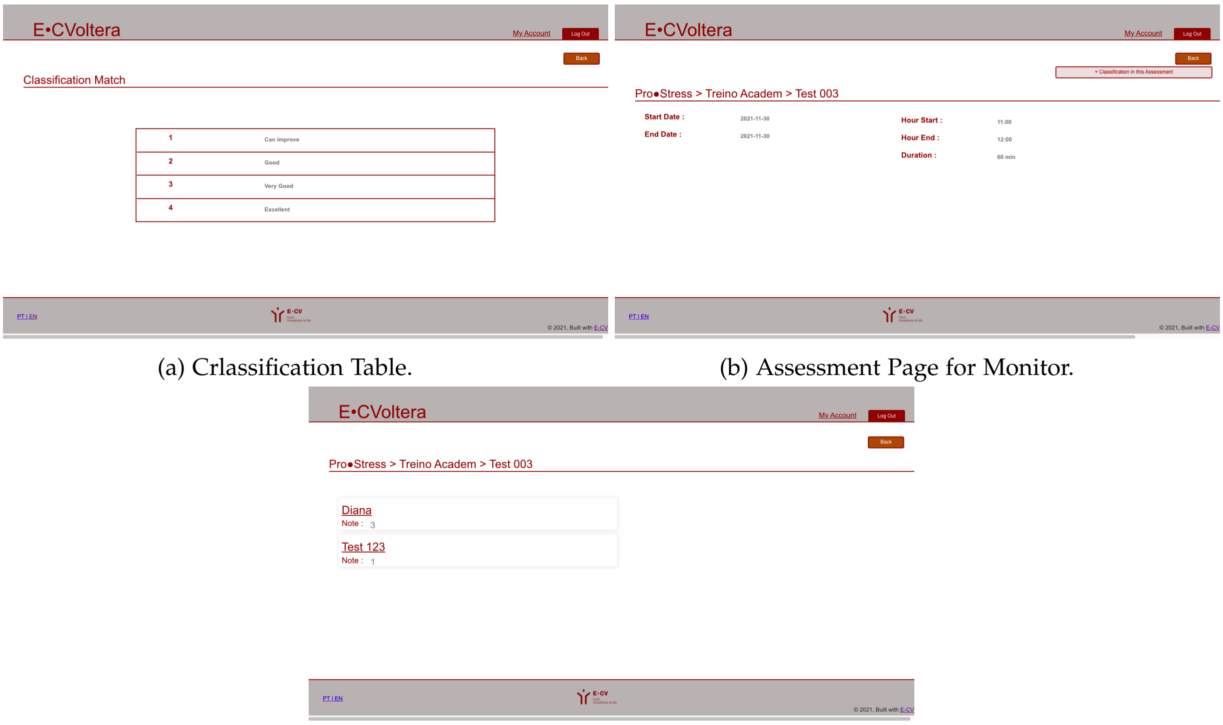
Figure 44: Forms to create Service Components

The three screenshots in Figure 70 show the forms to create components associated to a Service, which the Monitor wants to make available to the Service Participants. On these pages, are intended to enable the Monitor to create new activities, assessments as well as new training rooms. These forms provide, text boxes for the user to enter the necessary information for the creation of those Service components.

Complementary and as can be seen in the six screenshots compiled in Figure 52, some pages are provided to support the Monitors' course management tasks. Those pages list and display the different records that are created and associated with the service.

The page Pedagogical Book, Figure 52a, allows the Monitor to create a new session, recording the summary and later the presence of the participants. On this same page, the different existing sections relating to the service are also listed. For each session, the Monitor can also assign shares (positive or negative) to the Participants. In addition, the user is also able to verify all registered attendances as well as participations.

A full list of the activities associated with the service is displayed in the 'All Activities' page , Figure 52b. The referred list of activiities is divided into two lists, one with the activities undergoing or will take place and the other with the activities already ended. This filter uses the end date associated with each activity. This listing shows a kind of activity card with key information about it. So through this, it is possible to access the activity page. On this page, it is then possible to consult all the activity information items.



Classification Match

| | |
|---|---|
| 1 | Can improve |
| 2 | Good |
| 3 | Very Good |
| 4 | Excellent |

(a) Crlassification Table.

Pro●Stress > Treino Academ > Test 003

Start Date : 2021-11-30
End Date : 2021-11-30
Hour Start : 11:00
Hour End : 12:00
Duration : 60 min

(b) Assessment Page for Monitor.

Pro●Stress > Treino Academ > Test 003

Diana
Note : 3

Test 123
Note : 1

(c) Add Classification to Participants.

Figure 45: Assessment Flow for Monitor.

The Assessment page is identical to the 'All Activities' page discussed above, Figure 52d. At the top of this page, there is an option to see which level corresponds to the grade obtained/assigned so far, Figure 45a,this option is available for both Monitors and Participants. In the next section, all assessments of the service are listed in the form of cards. These present key information about them and it is through them that the user can access the page with all the assessment information. On this page, he can also assign the assessment grade to all Participants who performed the assessment. For this, Figure 45b and Figure 45c, in the assessments that are not carried out through online tests for generating automatic marks, the Monitor selects the Participant and inserts the mark he wants to give him.

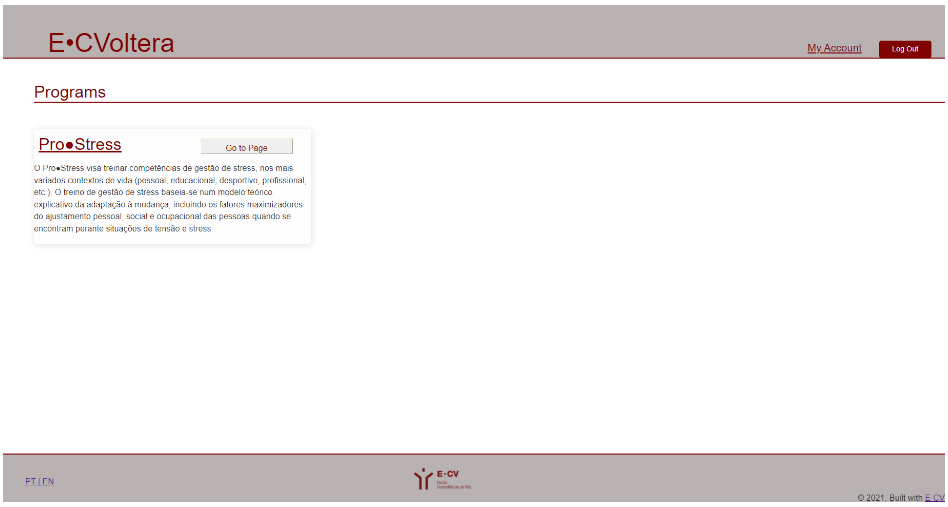
He Documents page, Figure 52c, all documents associated with that Service.

Regarding the Training Room, all rooms created with an interval of up to 1 day after its completion are displayed, Figure 52e. That is, as soon as the Training Room is created it is added to the display list but after it has been completed it remains in the list until one day after it has finished. When the Monitor creates the Training Room it has the 'Start' action available; when the Monitor selects it he forwarded to the Jitsi platform link as Call Moderator. After selecting this option, the user is redirected to the same link being able to enter the call. The background color of each of the training rooms will also vary. When the call has not yet started, it it is displayed in a red background. Once started, the displayed training room log will turn green.

Finally, the Opinion Forum page, Figure 52f, lists all the comments made by different registered users of the service. At the bottom of the page, the user has a text box where he is able to enter a comment.

## 5.7 PARTICIPANT EXPERIENCE

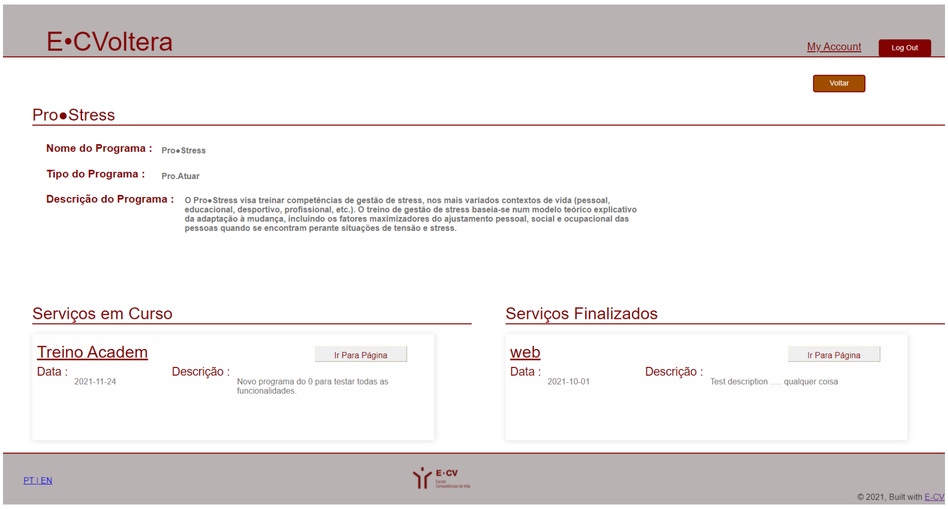
All Participant pages are for informational purposes only. Useful information regarding the different components is displayed. The Participant can only enter/edit information associated with his personal data, or enter comments in the 'Opinion Forum'.



O Pro●Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

Figure 46: E•CVOLTERA Participant Home Page

The Participant Homepage, Figure 46, displays all **Programs**in which he is enrrolled. On this page, he can go to the 'My account' page, Program page or LogOut.



**Nome do Programa :** Pro●Stress

**Tipo do Programa :** Pro.Atuar

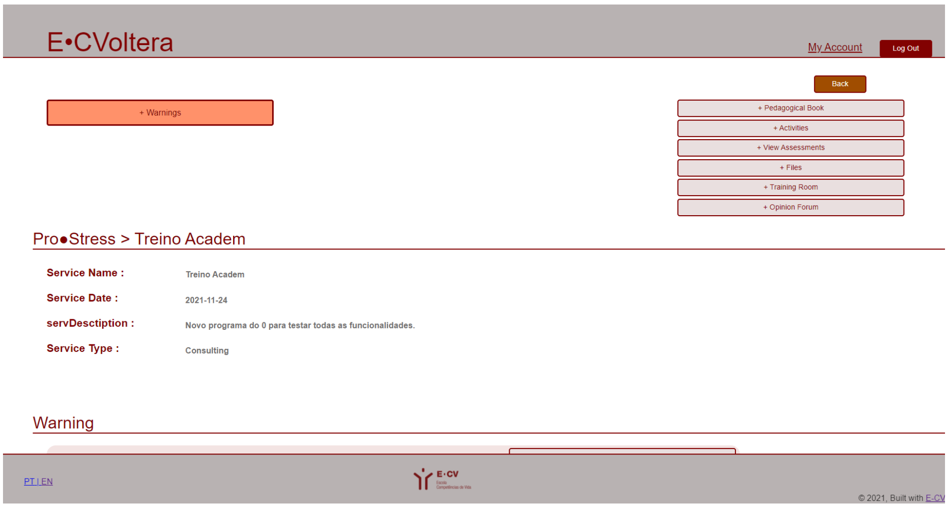
**Descrição do Programa :** O Pro●Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

Treino Academ
Data : 2021-11-24
Descrição : Novo programa do 0 para testar todas as funcionalidades.

web
Data : 2021-10-01
Descrição : Test description ..... qualquer coisa

Figure 47: E•CVOLTERA Program Page

When a user clicks on the Program Name, or in the button close to the name, he goes to the Program page, Figure 47.



Pro●Stress > Treino Academ

Service Name : Treino Academ

Service Date : 2021-11-24

servDesctiption : Novo programa do 0 para testar todas as funcionalidades.

Service Type : Consulting

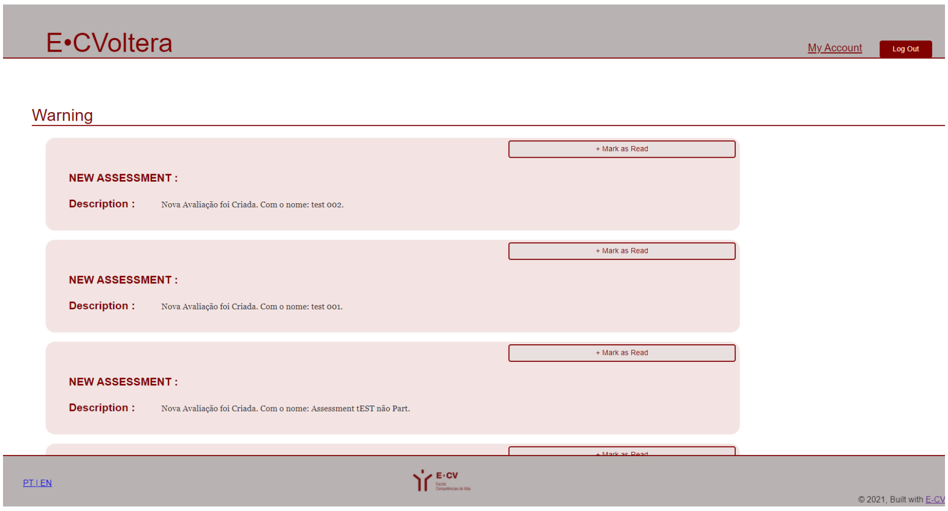
Warning

Figure 48: E•CVoltera Service Page

The Program page shows the information related to the Program (name, type and descriptiontion) on the topo of the central window.

Below it, two lists of Services related to this Program are displayed. On the left, the Services undergoing or upcoming; and on the right, the Services finished. When selected a service, the user moves to the Service page, Figure 48.

The Service page is organized in three parts. The central part displays all the fields related to the selected Service record. The top part exhibits a one column menu to allow the Participant to navigate to the various Service Components. In the bottom part a warnings lits will appear when necessary.



Warning

NEW ASSESSMENT :

Description : Nova Avaliação foi Criada. Com o nome: test 002.

NEW ASSESSMENT :

Description : Nova Avaliação foi Criada. Com o nome: test 001.

NEW ASSESSMENT :

Description : Nova Avaliação foi Criada. Com o nome: Assessment tEST não Part.

Figure 49: E•CVoltera Warnings List in Service Page

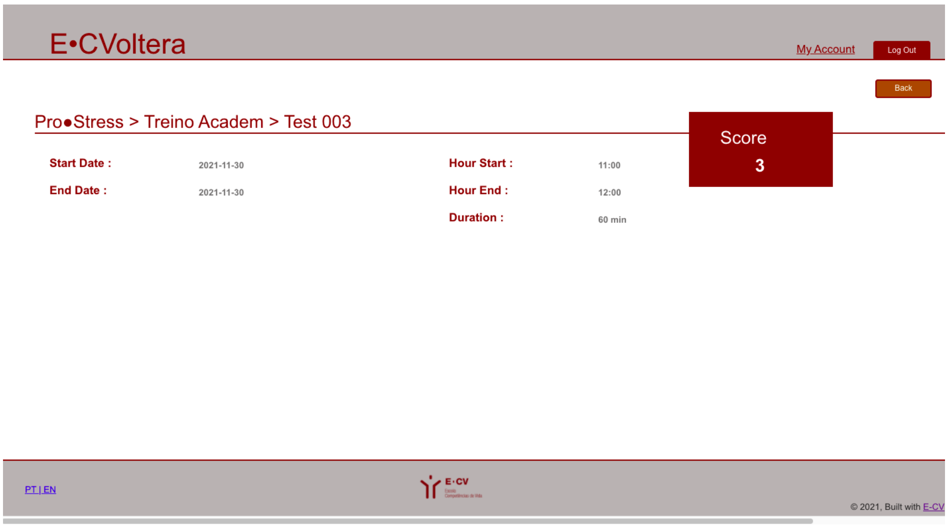
In order to make all the newly created Service Components easily identifiable, they are shown in the Warning list displayed in the bottom part of the central window, Figure 49. In order to notify the user that a new Component has been added to the Service.

Figure 53, containing six screenshots, illustrates the Service Component pages acessible to the Participant through the menu exhibited in the Service page, as described above.

In the page Pedagogical Book, Figure 53a, the participant can see the different existing sessions related to the service. For each session, the Participant can see, the registered participants as well as all the attendances.

The pages for 'All Activities', Figure 53b, Documents, Figure 53d, and Opinion Forum, Figure 53f, available to the Participant will look exactly like those for the Monitor, explained above.

On the Assessment page, Figure 53c, the Participant can see all the Assessments assigned to him as well as the grade got for each one. In addition, at the top of the page, the Participant can see the average he got so far with all the ratings he has. Like the Monitor, the Participant can also access the Assessment page from the assessment card by selecting the Assessment Name or the 'Go To Page' action. This page displays information relating to the Assessment as well as the grade obtained in that specific Assessment, Figure 50.



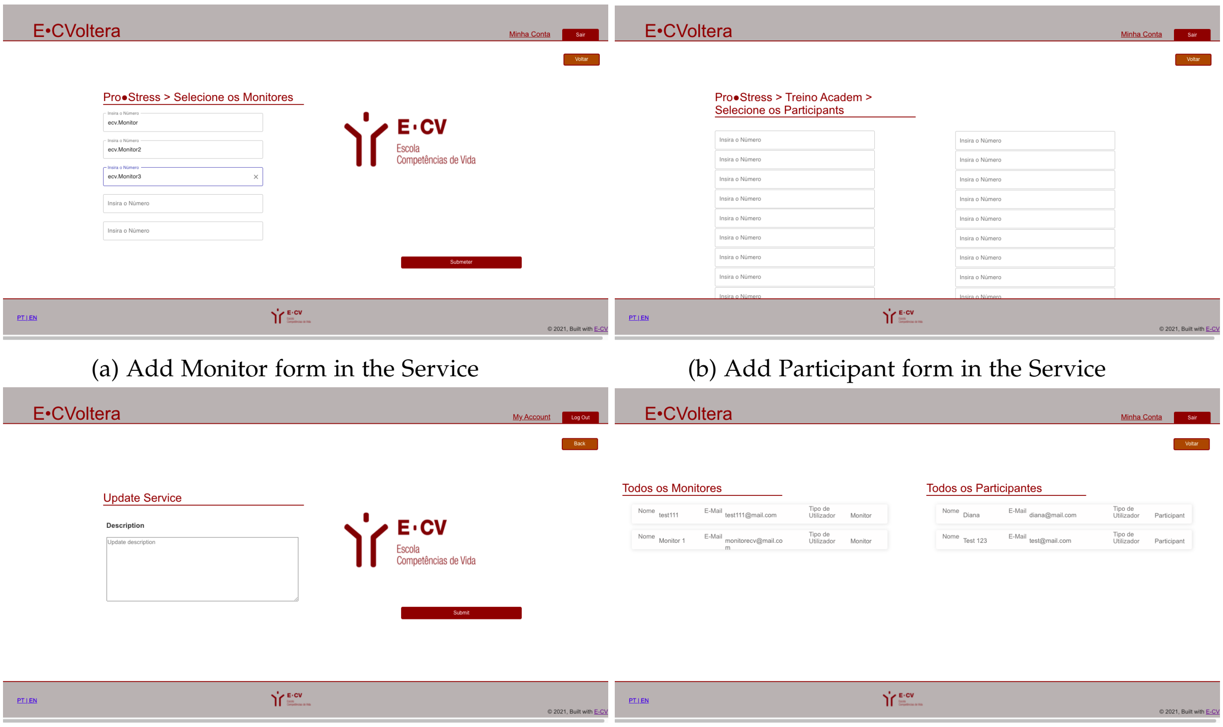
Pro•Stress > Treino Academ > Test 003

Start Date : 2021-11-30
End Date : 2021-11-30
Hour Start : 11:00
Hour End : 12:00
Duration : 60 min

Score
3

Figure 50: E•CVolteraAssessment Page for Participant.

Finally, on the Training Rooms page, Figure 53e, all calls are listed according exactly to the same criterion explained for the Monitor. The difference is in the specific behavior. When the call is not initialized, a label is displayed with the information that the call has not been initialized, with a red background. After the call is initiated the participant is presented with the option to 'Join' the training room, with a green background.



Pro●Stress > Selecione os Monitores

Insira o Número: ecv.Monitor

Insira o Número: ecv.Monitor2

Insira o Número: ecv.Monitor3

Insira o Número

Insira o Número

(a) Add Monitor form in the Service

Pro●Stress > Treino Academ > Selecione os Participants

| | |
|---|---|
| Insira o Número | Insira o Número |
| Insira o Número | Insira o Número |
| Insira o Número | Insira o Número |
| Insira o Número | Insira o Número |
| Insira o Número | Insira o Número |
| Insira o Número | Insira o Número |
| Insira o Número | Insira o Número |
| Insira o Número | Insira o Número |
| Insira o Número | Insira o Número |

(b) Add Participant form in the Service

Update Service

Description

Update description

(c) Edit Service form in the Service

Todos os Monitores

| Nome | | E-Mail | | Tipo de Utilizador | |
|---|---|---|---|---|---|
| Nome | test111 | E-Mail | test111@mail.com | Tipo de Utilizador | Monitor |
| Nome | Monitor 1 | E-Mail | monitorecv@mail.com | Tipo de Utilizador | Monitor |

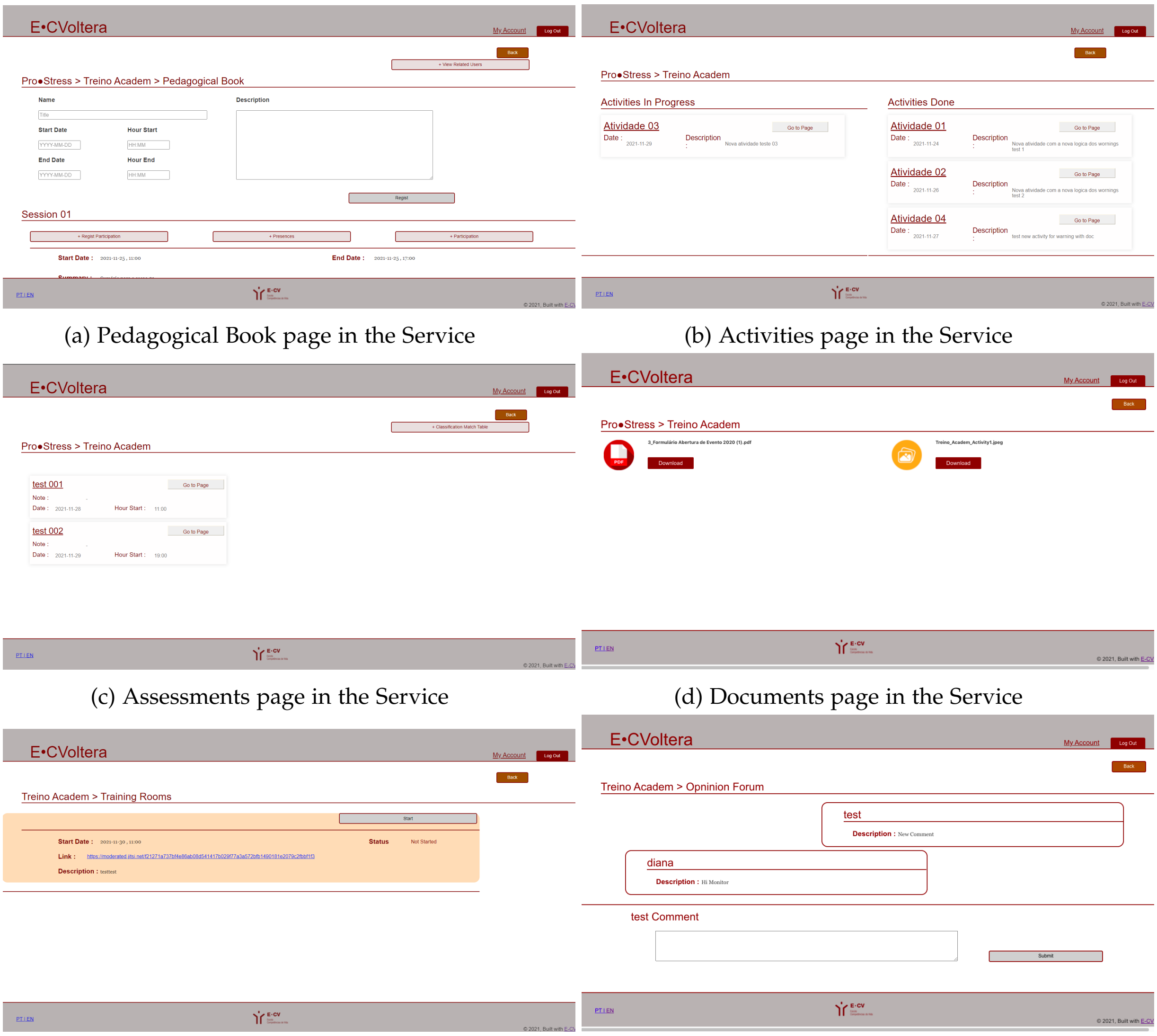
Todos os Participantes

| | | | | | |
|---|---|---|---|---|---|
| Nome | Diana | E-Mail | diana@mail.com | Tipo de Utilizador | Participant |
| Nome | Test 123 | E-Mail | test@mail.com | Tipo de Utilizador | Participant |

(d) Service Related Users

Figure 51: Pages to admin a Service

The different sequences of actions necessary to perform the daily tasks of E•CV Administrators, Monitors and Participants are explained in Appendix C.



Pro●Stress > Treino Academ > Pedagogical Book

Name: Title

Start Date: YYYY-MM-DD    Hour Start: HH:MM

End Date: YYYY-MM-DD    Hour End: HH:MM

Description

Session 01

Start Date : 2021-11-25 , 11:00    End Date : 2021-11-25 , 17:00

(a) Pedagogical Book page in the Service

Pro●Stress > Treino Academ

Activities In Progress

Atividade 03
Date : 2021-11-29    Description : Nova atividade teste 03

Activities Done

Atividade 01
Date : 2021-11-24    Description : Nova atividade com a nova logica dos wornings test 1

Atividade 02
Date : 2021-11-26    Description : Nova atividade com a nova logica dos wornings test 2

Atividade 04
Date : 2021-11-27    Description : test new activity for warning with doc

(b) Activities page in the Service

Pro●Stress > Treino Academ

test 001
Note : -
Date : 2021-11-28    Hour Start : 11:00

test 002
Note : -
Date : 2021-11-29    Hour Start : 19:00

(c) Assessments page in the Service

Pro●Stress > Treino Academ

3_Formulário Abertura de Evento 2020 (1).pdf

Treino_Academ_Activity1.jpeg

(d) Documents page in the Service

Treino Academ > Training Rooms

Start Date : 2021-11-30 , 11:00    Status Not Started

Link : https://moderated.jitsi.net/f21271a737bf4e86ab08d541417b029f77a3a572bfb1490181e2079c2fbbf1f3

Description : testtest

(e) Training Rooms page in the Service

Treino Academ > Opninion Forum

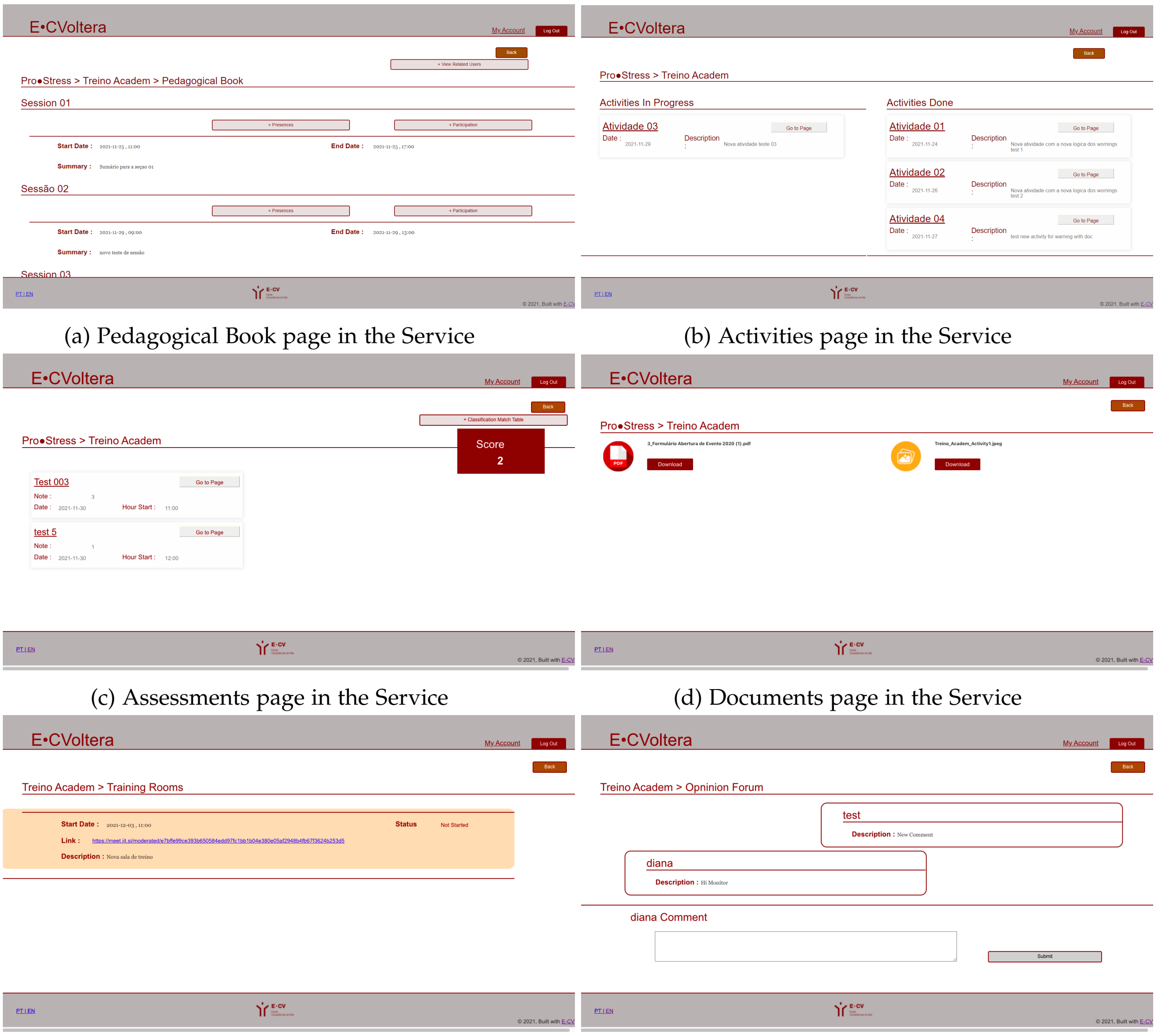
test
Description : New Comment

diana
Description : Hi Monitor

test Comment

(f) Opinions Forum page in the Service

Figure 52: Elements Pages in the Service for Monitor



Pro●Stress > Treino Academ > Pedagogical Book

Session 01

**Start Date :** 2021-11-25 , 11:00 **End Date :** 2021-11-25 , 17:00

**Summary :** Sumário para a seçao 01

Sessão 02

**Start Date :** 2021-11-29 , 09:00 **End Date :** 2021-11-29 , 13:00

**Summary :** novo teste de sessão

Session 03

(a) Pedagogical Book page in the Service

Pro●Stress > Treino Academ

Activities In Progress

Atividade 03
Date : 2021-11-29 Description : Nova atividade teste 03

Activities Done

Atividade 01
Date : 2021-11-24 Description : Nova atividade com a nova logica dos wornings test 1

Atividade 02
Date : 2021-11-26 Description : Nova atividade com a nova logica dos wornings test 2

Atividade 04
Date : 2021-11-27 Description : test new activity for warning with doc

(b) Activities page in the Service

Pro●Stress > Treino Academ

Score
2

Test 003
Note : 3
Date : 2021-11-30 Hour Start : 11:00

test 5
Note : 1
Date : 2021-11-30 Hour Start : 12:00

(c) Assessments page in the Service

Pro●Stress > Treino Academ

3_Formulário Abertura de Evento 2020 (1).pdf

Treino_Academ_Activity1.jpeg

(d) Documents page in the Service

Treino Academ > Training Rooms

**Start Date :** 2021-12-03 , 11:00 **Status** Not Started

**Link :** https://meet.jit.si/moderated/e7bffe99ce393b650584edd97fc1bb1b04e380e05af2948b4fb67f3624b253d5

**Description :** Nova sala de treino

(e) Training Rooms page in the Service

Treino Academ > Opnionion Forum

test
**Description :** New Comment

diana
**Description :** Hi Monitor

diana Comment

(f) Opinions Forum page in the Service

Figure 53: Service Component Pages available to the Participant

# 6

# CONCLUSION

After the presentation of the project, its context, motivation, objetives and development method, after the problem anylisis with requirements elicitation, the design of a possible software architechture to overcome the Client needs, the implementation and evaluation of the proposed solution, it is then possible to summarize the dissertation and draw the main conclusions about the work done.

All around the world companies are migrating traditional software applications to modern online plataforms. E•CV is no different and also felt the need to create an online platform to manage the different courses it hosts.
Initially, the essential concepts associated with E•CV, as well as the platforms previously used and the negative aspects identified were studied and analyzed to be possible to propose a platform that corresponded to all the features required for the management of the different courses that belong to the E•CV activity plan. After that, the architecture of a system based on the requirement survey carried out was proposed. this architecture is an online platform for the management of E•CV. Thus, a WEB application was developed where users can be created (Admin, Monitor, and Participant) for the creation/management of a course. Since the system under development is a robust system, an exhaustive survey of the requirements was carried out, as well as constant meetings with the E•CV so that all functionalities were developed as closely as possible to the felt needs.
Later, some use case diagrams were drawn so that before going into production the different actions performed by the different profiles are set clearly for the both developer and the final user. At this point, we realized that it would not make sense for users to use the platform without having to log in beforehand, since the platform would work as a course manager.
The application involved developing a frontend in TypeScript, CSS, React and GatsbyJS; and a backend in NodeJS. It was also necessary to develop a MongoDB database to accommodate all application data and text files loaded by the user.
Finally, the application was deployed using a DI server, where it can be accessed publicly via the URL: **https://evoltera.di.uminho.pt**. This connection to the server was adopted from the beginning, which turned out to be an asset, avoiding last-minute precautions. Like

for example errors related to what **URL** the requests should be made and where each component should be running.

During these months of development of the Master project, some difficulties were felt mainly in installing the application in the Web Server, as well as the development of some features such as uploading/downloading files and automatically updating ratings.

However, the implementation approach adopetd, using short-duration sprints and frequent detailed meetings with E•CV Coordinators, made the development of the platform easier, clearer, and use it with real more motivational for both sides.

Now to improve the application it would be necessary to carry out more tests and courses carried out by E•CV to identify failures, runtime errors, or missing important functionalities.

## 6.1 CONTRIBUTIONS

The reported Master's work contributes with:

- The implementation of a WEB application that provides ECV Monitors and Participants a single platform with shortcuts for the different needs felt. That platform was deployed in the server and is acessible to `https://evoltera.di.uminho.pt/`;
- The implementation of a back-end system to respond to requests made by the users of the platform.
- The implementation of a database for all data needed for the proper functioning of the E•CV.

## 6.2 FUTURE WORK

There are always improvements or tweaks that can be made on developed platforms.

One improvement that would be important to carry out, which would make a difference compared to other course management applications, would be the implementation of a Follow up area after the course has been completed. This feature is intended to assure that the course Promotors keep receiving constant feedback on how a Student that completed a training activity is applying what he learnt in his daily life. This feedback shall be given by people previously selected by the participant. The selected Informers must follow the participant on a daily basis; to provided the desired feedback, they shall answer questions asked by the Monitors.

This functionality would be interesting from the point of view of E•CV since this Academy focuses on courses for the development of life skills. In this way, there would be a follow-up of the participants after the course is concluded, enhancing which of th topics they learnt are actually relevant and are being applied correctly.

Another interesting feature to be developed is the creation of a kind of repository within the platform. This repository will be useful so that whenever a Monitor wants to add content to a service/activity, which is already used in another service/activity, does not need to load again.

In this way, documents in the database are avoided, also simplifying the Monitor's action.

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# A

# FUNCTIONAL REQUIREMENTS

The Functional Requirements listed below outcame from the problem analysis described in Section 3.3

## A.1 USER USAGE

- **Requirement 1:** The User is able to login into the platform.
  **Justification:** The user must be able to log into the application in order to be able to perform all the desired actions.

- **Requirement 2:** The user must be able to select the Program you want to view.
  **Justification:** In order for the user to have access to the Program in which he is enrolled, he has the possibility to select the Program that he intends to carry out an action.

- **Requirement 3:** The user must be able to select the Service you want to view.
  **Justification:** In order for the user to have access to the Service they want to see, they must be able to go to the Service information page.

- **Requirement 4:** The user must be able to select the Activity you want to view.
  **Justification:** In order for the user to have access to the Activity they want to see, they must be able to go to the Activity information page.

- **Requirement 5:** The user must be able to select the Pedagogical book option and go to the Pedagogical book page.
  **Justification:** In order for the user to have access to the Pedagogical book and view all information associated. In the Pedagogical book page the user is able to see all the summaries and presences of the different Excercises.

- **Requirement 6:** The User in Pedagogical book page is able to see the list of participants registered for the Service.
  **Justification:** In order to enable the user able to know the number of participants and who are the same in a given Service, it has access to a list of participants in that Service.

- **Requirement 7:** The User in Pedagogical book page is able to see the list of Monitors registered for the Service.
  **Justification:** In order to understand those responsible for the service, the user must be able to see all monitors associated with the Service.

- **Requirement 8:** The user must be able to select the Content option and go to the Content page.
  **Justification:** In order for the user to have access to the Content and view all information associated. In the Content page the user is able to see all registed Contents on the service.

- **Requirement 9:** The user must be able to select the Assessment option and go to the Assessment page.
  **Justification:** In order for the user to have access to the Assessment and view all information associated. In the Assessment page the user is able to see all registed Assessments and which student they correspond on the service.

- **Requirement 10:** The user must be able to select the Warnings option and go to the Warnings page.
  **Justification:** In order for the user to have access to the Warnings and view all information associated. In the Warnings page the user is able to see all registed Warnings and which occurrence corresponds on the service.

- **Requirement 11:** The user must be able to select the Tarining Room option and go to the Tarining Room page.
  **Justification:** In order for the user to have access to the Tarining Room and view all information associated. In the Tarining Room page the user is able to see all registed Tarining Room and which date corresponds to the service.

- **Requirement 12:** The user must be able to select the Forum option and go to the Forum page.
  **Justification:** In order for the user to have access to the Forum and view all information associated. In theForum page the user is able to see all comments made.

## A.2 ADMIN VIEW

- **Requirement 13:** The Admin is able to regist others Admins, Monitors and Participants in the application.
  **Justification:** As the application focuses on Program management, it is important to have a registration system for participants and monitors.
- **Requirement 14:** The parameters required for Admins registration must be requested to the Admin.
  **Justification:** The Admin, to register other Admin in the system, must indicate the following fields:
  - Name;
  - Number E-CV (ecv.Adminxxxx);
  - Password;
  - Email;
  - Image;
  - User Type (Admin).
- **Requirement 15:** The parameters required for Monitors and Participants registration must be requested to the Admin.
  **Justification:** The Admin, to register Monitors or Prticipants users in the system, must indicate the following fields:
  - Name;
  - Number(of the Monitor or Participant) E-CV (ecv.Monitorxxxx or ecv.Participantxxxx);
  - Password;
  - Email;
  - Phone;
  - Image;
  - User Type. can select between:
    - Monitor;
    - Participant;
- **Requirement 16:** The Admin is able to regist Programs in the application.
  **Justification:** As the application focuses on Program management, it is important to have a registration system for Programs only available for Admins. Because he is solely responsible for managing the application.

- **Requirement 17:** The parameters required for Programs registration must be requested to the Admin.
  **Justification:** The Admin, to register Programs records in the system, must indicate the following fields:
  - Program Type. Can select between:
    - Pro.Action;
    - Pro.Planning;
    - Pro.Stress;
    - Pro.Interact;
    - Pro.Leader;
    - Pro.Team;
  - Name;
  - Description.

- **Requirement 18:** The Admin is able to see a list of all Programs registered in the system.
  **Justification:** To improve the experience on the platform, the Admin has easy access to all Programs and can see which ones are already created, he can see the list of existing ones.

- **Requirement 19:** The Admin is able to regist Services in the Program selected.
  **Justification:** In order for Program-associated Services to existing, it is important to have a Program-associated Services registration system available to administrators only. Because he is solely responsible for managing the application.

- **Requirement 20:** The parameters required for Services registration must be requested to the Admin.
  **Justification:** The Admin, to register Service records in the system, must indicate the following fields:
  - Service Type. Can select between;
    - Acedemy;
    - Consulting;
    - Personalized Suport;
    - Society - Workshop;
    - Society - Apresentation;
    - Society - Webinar;

  - Initial Date;
  - Final Date;
  - Description

- **Requirement 21:** The Admin when creating an Services the Initial Date cannot be less than tomorrow and the Final Date cannot be less than the Initial Date.
  **Justification:** So that the Service end date is not less than the start date and the start date is not in the past, an error message should be sent if the user tries to enter it.

- **Requirement 22:** The Admin is able to associate Monitors to Services in the Program selected.
  **Justification:** In order for the Monitor to have access to the created Program and Service, the Admin can associate Monitors to the Service.

- **Requirement 23:** The Admin is able to associate a maximum number of 5 Monitors to the Service.
  **Justification:** So that it is only a restricted number of Monitors that have permissions to edit and manage the service, it is only possible to associate 5 Monitors to the Service.

- **Requirement 24:** The Admin is able to associate Participants to Services in the Program selected.
  **Justification:** For each service there is a different maximum number of Participants:
  - Academy: 25 Participants;
  - Consulting: 25 Participants;
  - Personalized Suport: 25 Participants;
  - Society - Workshop: 100 Participants;
  - Society - Apresentation: 200 Participants;
  - Society - Webinar: 200 Participants;

## A.3 MONITOR VIEW

- **Requirement 25:** The Monitor can only see Programs it is subscribed to.
  **Justification:** In order to make the monitor's usability cleaner, it can only see the programs in which it has services where user is Monitor in the same services.

- **Requirement 26:** The Monitor can only see Services it is subscribed to.
  **Justification:** In order to make the monitor's usability cleaner, it can only see the Services where user is Monitor.

- **Requirement 27:** The Monitor has a list of Services he has already made and those you are currently managing.
  **Justification:** In order to improve the experience on the platform, the user has easy access to all the Services it is associated with.

- **Requirement 28:** Monitor has a list of Activities you have already performed and those you are currently managing.
  **Justification:** In order to improve the experience on the platform, the user has easy access to all the Activities it is associated with.

### A.3.1 *Manage Activities*

- **Requirement 29:** The monitor is able to create a new Activity in the Service that has management permission.
  **Justification:** The Monitor, to register Activities in the system, must indicate the following fields:
  - Name;
  - Start Date;
  - End Date;
  - Description;
  - Additional Links;
  - Documents.

- **Requirement 30:** The monitor when creating an Activity the Start Date cannot be less than tomorrow and the End Date cannot be less than the Start Date.
  **Justification:** So that the Activity end date is not less than the start date, an error message should be sent if the user tries to enter an end date before the start date.

- **Requirement 31:** The monitor is able to edit an Activity that has not yet started.
  **Justification:** The monitor can change previously recorded data such as Activity Dates, Additional Links and description.

### A.3.2 *Manage Assessment*

- **Requirement 32:** The monitor is able to create a new Assessment in the Service that has management permission.
  **Justification:** The Monitor, to register Assessment in the system, must indicate the following fields:
  - Name;
  - Start Date;
  - Start Hour;
  - End Date;
  - End Hour;
  - Duration;
  - Description;
  - Additional Links;
  - Is Visible for Participants?
  - Documents;
  - Option for Qualtrics
- **Requirement 33:** The monitor when creating an Assessment the Duration value cannot be less than 5min.
  **Justification:** So that the duration of an Assessment is not less than 5, an error message must be sent if the user tries to enter a duration less than 5 min.
- **Requirement 34:** The monitor when creating an Activity the Start Date cannot be less than today and the End Date cannot be less than the Start Date.
  **Justification:** So that the Activity end date is not less than the start date and the start date is not less than today, an error message should be sent if the user tries to enter it.
- **Requirement 35:** The monitor when creating an Activity the End Hour cannot be less than the Start Hour.
  **Justification:** So that the Activity end Hour is not less than the start Hour, an error message should be sent if the user tries to enter it.

- **Requirement 36:** The monitor when creating an Activity can select crate a QUALTRICS test in creating page.
  **Justification:** In order to be able to create tests with the possibility of generating the evaluation grade automatically, it must be possible to access QUALTRICS from the platform

- **Requirement 37:**The monitor should be able to load an Assessment for itself and send it later.
  **Justification:** So that the monitor can load the Assessment just for him and can be send the Assessment later for the students.

- **Requirement 38:** The monitor must be able to launch Assessment for students.
  **Justification:** In order for the monitor to be able to send Assessment for students to perform, it has the ability to select the 'launch' option and send Assessments to students.

### A.3.3 *View Contents*

- **Requirement 39:** The monitor must be able to add content to the Activity.
  **Justification:** In order for students to have access to different aids for their progress in the Activity, the monitor must be able to add content to the Activity.

- **Requirement 40:** The monitor must be able to see All Contents on the Activity.
  **Justification:** .

- **Requirement 41:** The monitor must be able to see All Contents on the Service.
  **Justification:** .

### A.3.4 *View Warnings*

- **Requirement 42:** The monitor must be able to See all Old Warnings on the Service.
  **Justification:** In order for the monitor to be able to warn students of what they deem necessary, they must then be able to launch announcements in a Service.

- **Requirement 43:** The monitor must be able to See all New Warnings on the Service Home Page.
  **Justification:**

### A.3.5 *Manage Pedagogical book*

- **Requirement 44:** The monitor is able to register Presences of participants in the Session.
  **Justification:** In order to understand how the student is doing, the monitor must be able to record when the participant's presence in Session.

- **Requirement 45:** The monitor is able to associate positive or negative check in 'Participation of Participant' in the participant's Service.
  **Justification:** In order for the monitor is able to understand how the student is progressing in a given Service, he must be able to add positive check during a training.

- **Requirement 46:** The monitor must be able to record the summary and attendance of an Service.
  **Justification:** For the monitor to be able to record everything that happens in the Service and who is present, he must be able to record the summary and attendance of the Session. Must indicate the following fields:
  - Title;
  - Start Date;
  - End Date;
  - Start Hour;
  - End Hour;
  - Summary.

- **Requirement 47:** The monitor when creating an Summary the Start Date cannot be less than today and the End Date cannot be less than the Start Date.
  **Justification:** So that the Summary end date is not less than the start date and the start date is not in the past, an error message should be sent if the user tries to enter an end date before the start date.

- **Requirement 48:** The monitor when creating an Summary the End Hour cannot be less than the Start Hour.
  **Justification:** So that the Summary end Hour is not less than the start Hour, an error message should be sent if the user tries to enter it.

- **Requirement 49:** The monitor is able to see All Presences of participants in the Session.
  **Justification:**

- **Requirement 50:** The monitor is able to see All Participation of participants in the Session.
  **Justification:**

### A.3.6 *Manage Classifications*

- **Requirement 51:** The monitor is able to insert a classification in a Asessment.
  **Justification:** In order for the student to have evaluation in all Excercises performed, the monitor must be able to assign a grade to the student.
- **Requirement 52:** The monitor is able to see all Classification in a Assessment.
  **Justification:**

### A.3.7 *Manage Training Room*

- **Requirement 53:** The Monitor is able to create a new Training room in the Service.
  **Justification:** In order for the monitor to be able to teach the Service with online classes, it can create a training room.
- **Requirement 54:** The Monitor is able to start a new Training room in the Service.
  **Justification:** In order for the monitor to be able to teach online, he can start a training room.
- **Requirement 55:** The start date can not be less than today.
  **Justification:**

Mange Opinions Forum

- **Requirement 56:** The Monitor must be able to make comments in the opinion forum.
  **Justification:** In order for the Monitor to be able to ask/answer possible questions or share his opinion on a subject, he has the ability to make comments in the Opinions forum.

## A.4 PARTICIPANTS VIEW

- **Requirement 57:** The Participant can only see Programs it is subscribed to.
  **Justification:** In order to make the monitor's usability cleaner, it can only see the programs in which it has services where user is Participant in the same services.

- **Requirement 58:** The Participant can only see Services it is subscribed to.
  **Justification:** In order to make the monitor's usability cleaner, it can only see the Services where user is Participant.

- **Requirement 59:** The Participant has a list of Services he has already made and those you are currently subscribed to.
  **Justification:** In order to improve the experience on the platform, the user has easy access to all the Services it is associated with.

- **Requirement 60:** The Participant has a list of Activities you have already performed and those you are subscribed to.
  **Justification:** In order to improve the experience on the platform, the user has easy access to all the Activities it is associated with. And he has access to the list of Ativities already carried out.

### A.4.1 *View Ativities*

- **Requirement 61:** The Participant can see all Ativities opened.
  **Justification:** In order for the Participant to know what tasks they still need to perform, they have access to a list of all the Ativities they still need to perform.

- **Requirement 62:** The Participant can see all Ativities performed.
  **Justification:**

### A.4.2 *View Assessments*

- **Requirement 63:** The Participant can see all Assessments he has.
  **Justification:** In order for the Participant to know what Assessment they still need to perform, they have access to a list of all the Assessments they still need to perform.

- **Requirement 64:** The Participant can do an Test.
  **Justification:** The Participant can take a Test scheduled in the Program to see if the knowledge acquired is correct.

- **Requirement 65:** The Participant can see all marks obtained in their evaluations.
  **Justification:** The participant can see all the marks obtained in their evaluations to see their evolution

### A.4.3 *View Contents*

- **Requirement 66:** The Participant must be able to see All Contents on the Activity.
  **Justification:** .

- **Requirement 67:** The Participant must be able to see All Contents on the Service.
  **Justification:** .

### A.4.4 *View Warnings*

- **Requirement 68:** The Participant must be able to See all Old Warnings on the Service.
  **Justification:**

- **Requirement 69:** The Participant must be able to See all New Warnings on the Service Home Page.
  **Justification:**

### A.4.5 *View Pedagogical Boock*

- **Requirement 70:** The Participant must be able to See all differents Session created on the Service.
  **Justification:**

- **Requirement 71:** The Participant must be able to See the Summary registered on the different Sessions.
  **Justification:**

- **Requirement 72:** The Participant must be able to See the Presences registered on the different Sessions.
  **Justification:**

- **Requirement 73:** The Participant must be able to See the Participations registered on the different Sessions.
  **Justification:**

### A.4.6 *View Classifications*

- **Requirement 74:** The Participant can see your classification in the Assessment.
  **Justification:** In order to understand how the Service is progressing, the Participant can see the general classification obtained in the Assessment.

- **Requirement 75:** The Participant must be able to See their average across all Assessments.
  **Justification:**

### A.4.7 *Training Room*

- **Requirement 76:**The Participant should be able to see the Training Room.
  **Justification:**

- **Requirement 77:** The Participant is able to enter in a Training room the Program.
  **Justification:** In order for the Participant to be able to learn online, he can enter a training room.

### A.4.8 *View Opinions Forum*

- **Requirement 78:** The Participant must be able to make comments in the opinion forum.
  **Justification:** In order for the Participant to be able to ask/answer possible questions or share his opinion on a subject, he has the ability to make comments in the Opinions forum.

# B

# NON FUNCTIONAL REQUIREMENTS

The Non Functional Requirements listed below were designed after the problem analysis described in Chapter 3.3

- **Requirement 79:** The system provides access to the Classifications through the List of Excercises already carried out.
  **Justification:** On the page where all the Excercises already carried out are listed, the user can quickly access the obtained ratings.

- **Requirement 80:** Only the Admin should have the privilege to create an Program.
  **Justification:** No other user profile should be able to create an Program.

- **Requirement 81:** Only the Admin must have privileges to configure and change the Program.
  **Justification:** No other Program usage profile should be able to modify Program settings.

- **Requirement 82:** Only the Monitor should have the privilege to create an Activity and Assessment.
  **Justification:** No other user profile should be able to create an Activity and Assessment.

- **Requirement 83:** Only the Monitor must have privileges to configure and change the Activity.
  **Justification:** No other Program usage profile should be able to modify Activity settings.

- **Requirement 84:** The application must support multiple languages.
  **Justification:** In order that the platform covers as many people as possible, it was decided to develop the platform in two languages. In portuguese since the platform was developed and designed by Portugueses and in english since it is a universal language

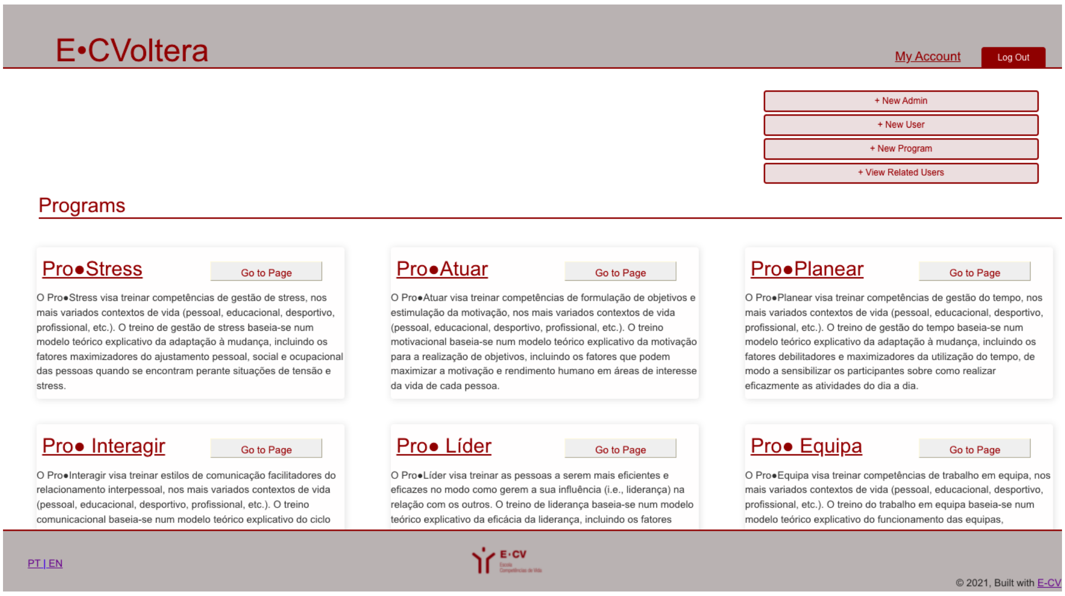
# C

# E•CVOLTERA USER'S GUIDE

## C.1 ADMIN - FUNCTIONALITIES

An Admin is able to perform the following actions:

1. **View My Account** (Sub-Section C.1.1);
2. **Create Proram** (Sub-Section C.1.2);
3. **View Program** (Sub-Section C.1.3);
4. **Create other Admin User** (Sub-Section C.1.4);
5. **Create Monitor or Participant** (Sub-Section C.1.5);
6. **View Users** (Sub-Section C.1.6);
7. **Create Service** (Sub-Section C.1.7);
8. **Edit a Program** (Sub-Section C.1.12);
9. **View Service** (Sub-Section C.1.9);
10. **Add Monitor or Participant in the Service** (Sub-Section C.1.10);
11. **View Monitors and Participants in the Service** (Sub-Section C.1.11);
12. **Edit Service** (Sub-Section C.1.12);
13. **Delete Service** (Sub-Section C.1.13).



Pro•Stress

O Pro•Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

Pro•Atuar

O Pro•Atuar visa treinar competências de formulação de objetivos e estimulação da motivação, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino motivacional baseia-se num modelo teórico explicativo da motivação para a realização de objetivos, incluindo os fatores que podem maximizar a motivação e rendimento humano em áreas de interesse da vida de cada pessoa.

Pro•Planear

O Pro•Planear visa treinar competências de gestão do tempo, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão do tempo baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores debilitadores e maximizadores da utilização do tempo, de modo a sensibilizar os participantes sobre como realizar eficazmente as atividades do dia a dia.

Pro• Interagir

O Pro•Interagir visa treinar estilos de comunicação facilitadores do relacionamento interpessoal, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino comunicacional baseia-se num modelo teórico explicativo do ciclo

Pro• Líder

O Pro•Líder visa treinar as pessoas a serem mais eficientes e eficazes no modo como gerem a sua influência (i.e., liderança) na relação com os outros. O treino de liderança baseia-se num modelo teórico explicativo da eficácia da liderança, incluindo os fatores

Pro• Equipa

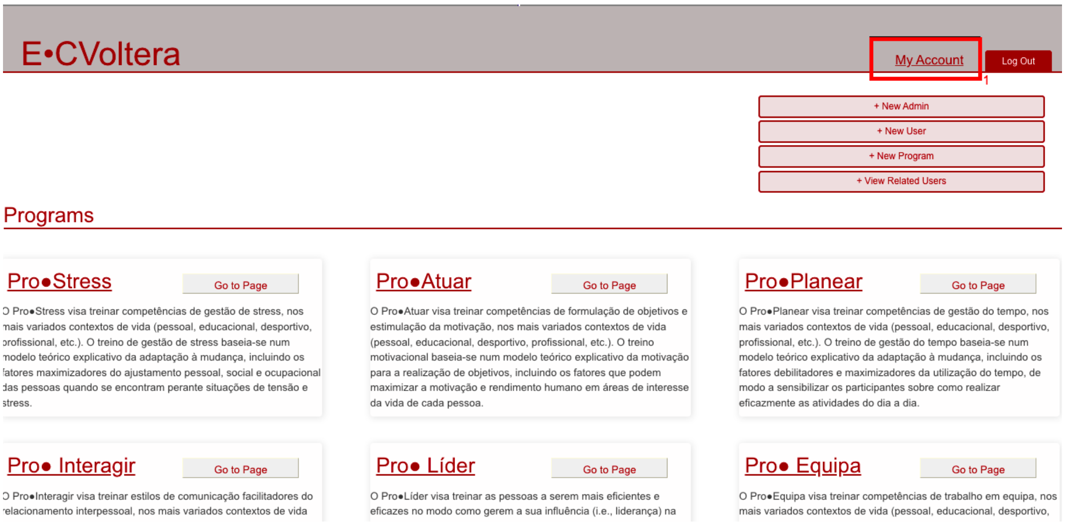
O Pro•Equipa visa treinar competências de trabalho em equipa, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino do trabalho em equipa baseia-se num modelo teórico explicativo do funcionamento das equipas,

Figure 54: E•CVoltera Admin Home Page.

The Admin Homepage, Figure 54, exhibits in the middle part of the window all Programs registered until now and some actions.

### C.1.1 *View My Account*

For the user to be able to see the details of his account, he must select the action *'My Account'*(marked as number 1),Figure 55.



Pro•Stress

O Pro•Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

Pro•Atuar

O Pro•Atuar visa treinar competências de formulação de objetivos e estimulação da motivação, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino motivacional baseia-se num modelo teórico explicativo da motivação para a realização de objetivos, incluindo os fatores que podem maximizar a motivação e rendimento humano em áreas de interesse da vida de cada pessoa.

Pro•Planear

O Pro•Planear visa treinar competências de gestão do tempo, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão do tempo baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores debilitadores e maximizadores da utilização do tempo, de modo a sensibilizar os participantes sobre como realizar eficazmente as atividades do dia a dia.

Pro• Interagir

O Pro•Interagir visa treinar estilos de comunicação facilitadores do relacionamento interpessoal, nos mais variados contextos de vida

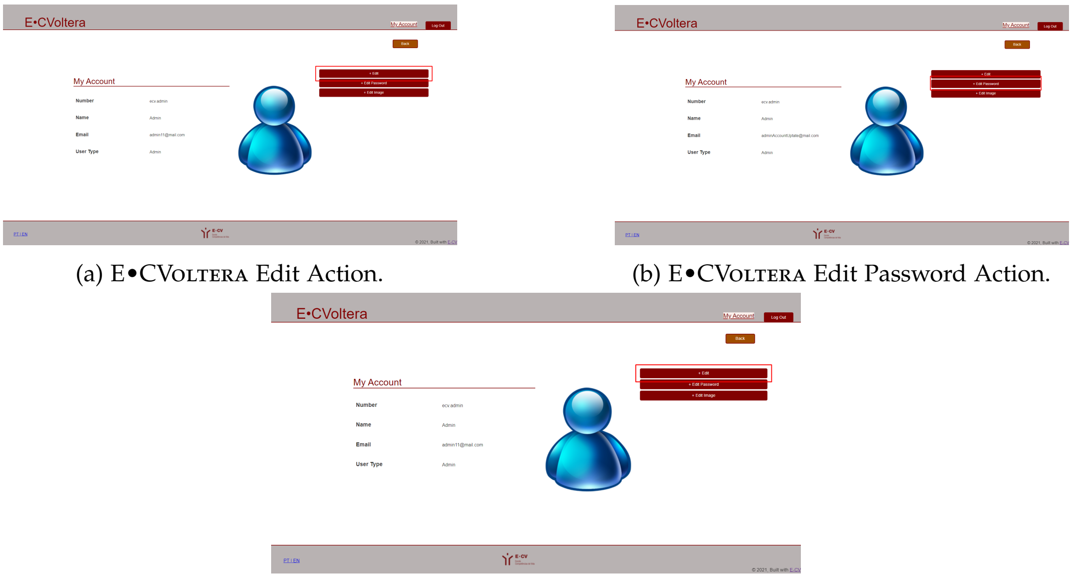
Pro• Líder

O Pro•Líder visa treinar as pessoas a serem mais eficientes e eficazes no modo como gerem a sua influência (i.e., liderança) na

Pro• Equipa

O Pro•Equipa visa treinar competências de trabalho em equipa, nos mais variados contextos de vida (pessoal, educacional, desportivo,

Figure 55: E•CVoltera View My Account Action.



My Account

Number ecv.admin

Name Admin

Email admin11@mail.com

User Type Admin

(a) E•CVoltera Edit Action.

My Account

Number ecv.admin

Name Admin

Email adminAccountUptate@mail.com

User Type Admin

(b) E•CVoltera Edit Password Action.

My Account

Number ecv.admin

Name Admin

Email admin11@mail.com

User Type Admin

(c) E•CVoltera Edit Image Action.

Figure 56: E•CVoltera My Account Actions.

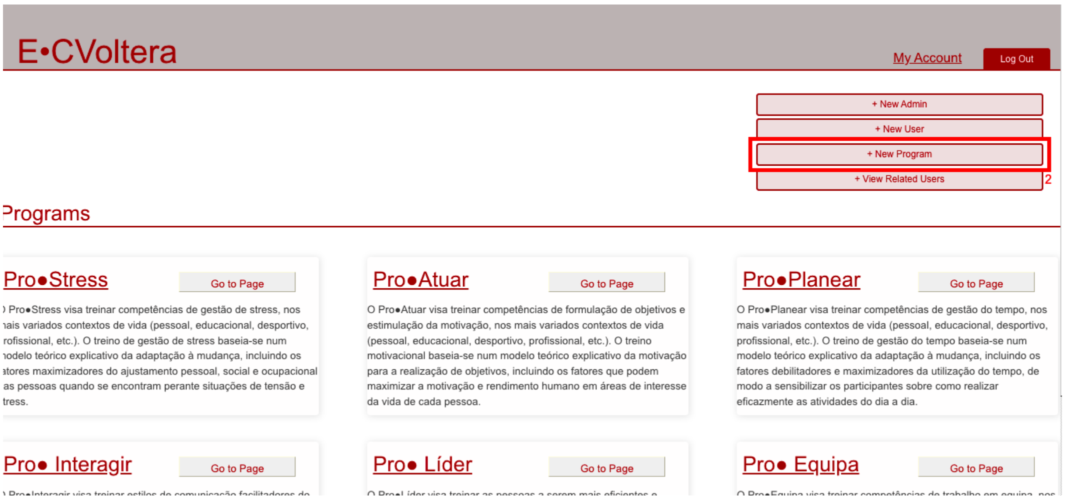
All the users that logged in the platform successfully have access to the 'My Account' page. In this page the user can see all infomations associated to him. The flow in Admin view is showed in this section, but the application behavior for Participants and Monitors follows the same logic.
As Admin, the user can perform the following actions:

- **Edit** (Figure 56a);
- **Edit Password** (Figure 56b);
- **Edit Image** (Figure 56c).

Any of these actions will be used to edit the identification items associated with the logged-in user.

### C.1.2 *Create Proram*

For the user to be able to create a Program, he must select the action *'New Program'*(marked as number 2),Figure 57.



) Pro•Stress visa treinar competências de gestão de stress, nos
ıais variados contextos de vida (pessoal, educacional, desportivo,
rofissional, etc.). O treino de gestão de stress baseia-se num
ıodelo teórico explicativo da adaptação à mudança, incluindo os
ıtores maximizadores do ajustamento pessoal, social e ocupacional
as pessoas quando se encontram perante situações de tensão e
tress.

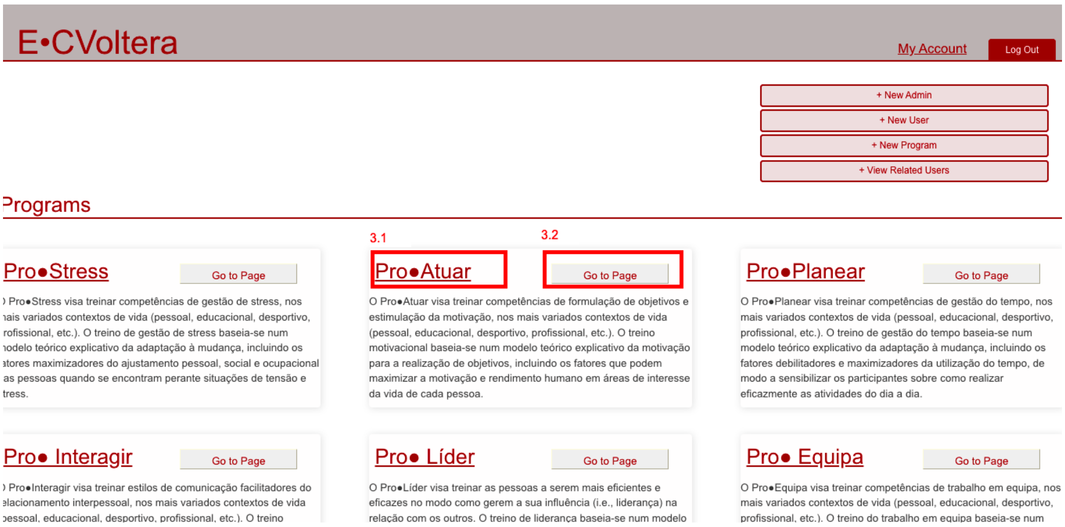
O Pro•Atuar visa treinar competências de formulação de objetivos e
estimulação da motivação, nos mais variados contextos de vida
(pessoal, educacional, desportivo, profissional, etc.). O treino
motivacional baseia-se num modelo teórico explicativo da motivação
para a realização de objetivos, incluindo os fatores que podem
maximizar a motivação e rendimento humano em áreas de interesse
da vida de cada pessoa.

O Pro•Planear visa treinar competências de gestão do tempo, nos
mais variados contextos de vida (pessoal, educacional, desportivo,
profissional, etc.). O treino de gestão do tempo baseia-se num
modelo teórico explicativo da adaptação à mudança, incluindo os
fatores debilitadores e maximizadores da utilização do tempo, de
modo a sensibilizar os participantes sobre como realizar
eficazmente as atividades do dia a dia.

Figure 57: E•CVoltera New Program Action.

## C.1.3 *View Program*

For the user to be able to view a **Program**, he must select the Program Name or the action *'Go to Page'*(marked as number 3.1 and 3.2),Figure 58.



) Pro•Stress visa treinar competências de gestão de stress, nos
ıais variados contextos de vida (pessoal, educacional, desportivo,
rofissional, etc.). O treino de gestão de stress baseia-se num
ıodelo teórico explicativo da adaptação à mudança, incluindo os
ıtores maximizadores do ajustamento pessoal, social e ocupacional
as pessoas quando se encontram perante situações de tensão e
tress.

O Pro•Atuar visa treinar competências de formulação de objetivos e
estimulação da motivação, nos mais variados contextos de vida
(pessoal, educacional, desportivo, profissional, etc.). O treino
motivacional baseia-se num modelo teórico explicativo da motivação
para a realização de objetivos, incluindo os fatores que podem
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da vida de cada pessoa.

O Pro•Planear visa treinar competências de gestão do tempo, nos
mais variados contextos de vida (pessoal, educacional, desportivo,
profissional, etc.). O treino de gestão do tempo baseia-se num
modelo teórico explicativo da adaptação à mudança, incluindo os
fatores debilitadores e maximizadores da utilização do tempo, de
modo a sensibilizar os participantes sobre como realizar
eficazmente as atividades do dia a dia.

) Pro•Interagir visa treinar estilos de comunicação facilitadores do
elacionamento interpessoal, nos mais variados contextos de vida
ɔessoal, educacional, desportivo, profissional, etc.). O treino

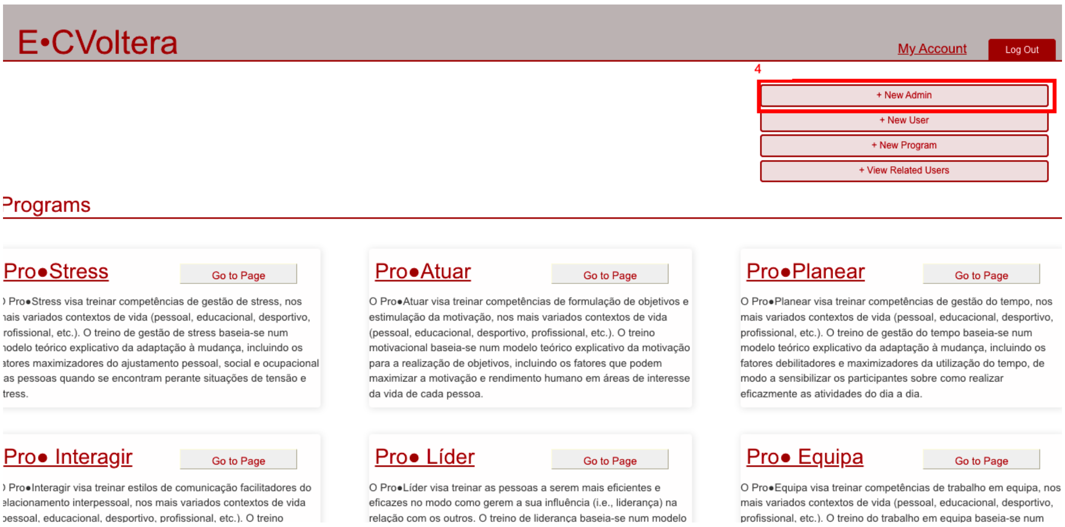
O Pro•Líder visa treinar as pessoas a serem mais eficientes e
eficazes no modo como gerem a sua influência (i.e., liderança) na
relação com os outros. O treino de liderança baseia-se num modelo

O Pro•Equipa visa treinar competências de trabalho em equipa, nos
mais variados contextos de vida (pessoal, educacional, desportivo,
profissional, etc.). O treino do trabalho em equipa baseia-se num

Figure 58: E•CVoltera View Program Action.

## C.1.4 *Create other Admin User*

For the user to be able to create other Admin, he must select the action *'New Admin'*(marked as number 4),Figure 59.



Pro●Stress

) Pro●Stress visa treinar competências de gestão de stress, nos nais variados contextos de vida (pessoal, educacional, desportivo, rofissional, etc.). O treino de gestão de stress baseia-se num nodelo teórico explicativo da adaptação à mudança, incluindo os atores maximizadores do ajustamento pessoal, social e ocupacional as pessoas quando se encontram perante situações de tensão e tress.

Pro●Atuar

O Pro●Atuar visa treinar competências de formulação de objetivos e estimulação da motivação, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino motivacional baseia-se num modelo teórico explicativo da motivação para a realização de objetivos, incluindo os fatores que podem maximizar a motivação e rendimento humano em áreas de interesse da vida de cada pessoa.

Pro●Planear

O Pro●Planear visa treinar competências de gestão do tempo, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão do tempo baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores debilitadores e maximizadores da utilização do tempo, de modo a sensibilizar os participantes sobre como realizar eficazmente as atividades do dia a dia.

Pro● Interagir

) Pro●Interagir visa treinar estilos de comunicação facilitadores do elacionamento interpessoal, nos mais variados contextos de vida pessoal, educacional, desportivo, profissional, etc.). O treino

Pro● Líder

O Pro●Líder visa treinar as pessoas a serem mais eficientes e eficazes no modo como gerem a sua influência (i.e., liderança) na relação com os outros. O treino de liderança baseia-se num modelo

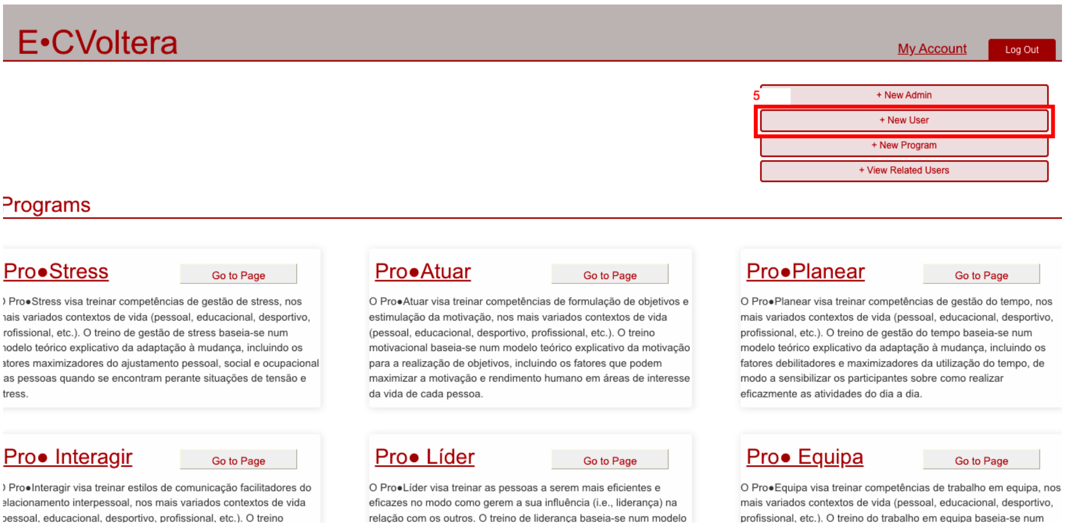
Pro● Equipa

O Pro●Equipa visa treinar competências de trabalho em equipa, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino do trabalho em equipa baseia-se num

Figure 59: E•CVoltera New Admin Action.

### C.1.5 *Create Monitor or Participant*

For the user to be able to create a Monitor or Participant, he must select the action *'New User'*(marked as number 5),Figure 60.



Pro●Stress

) Pro●Stress visa treinar competências de gestão de stress, nos nais variados contextos de vida (pessoal, educacional, desportivo, rofissional, etc.). O treino de gestão de stress baseia-se num nodelo teórico explicativo da adaptação à mudança, incluindo os atores maximizadores do ajustamento pessoal, social e ocupacional as pessoas quando se encontram perante situações de tensão e tress.

Pro●Atuar

O Pro●Atuar visa treinar competências de formulação de objetivos e estimulação da motivação, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino motivacional baseia-se num modelo teórico explicativo da motivação para a realização de objetivos, incluindo os fatores que podem maximizar a motivação e rendimento humano em áreas de interesse da vida de cada pessoa.

Pro●Planear

O Pro●Planear visa treinar competências de gestão do tempo, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão do tempo baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores debilitadores e maximizadores da utilização do tempo, de modo a sensibilizar os participantes sobre como realizar eficazmente as atividades do dia a dia.

Pro● Interagir

) Pro●Interagir visa treinar estilos de comunicação facilitadores do elacionamento interpessoal, nos mais variados contextos de vida pessoal, educacional, desportivo, profissional, etc.). O treino

Pro● Líder

O Pro●Líder visa treinar as pessoas a serem mais eficientes e eficazes no modo como gerem a sua influência (i.e., liderança) na relação com os outros. O treino de liderança baseia-se num modelo

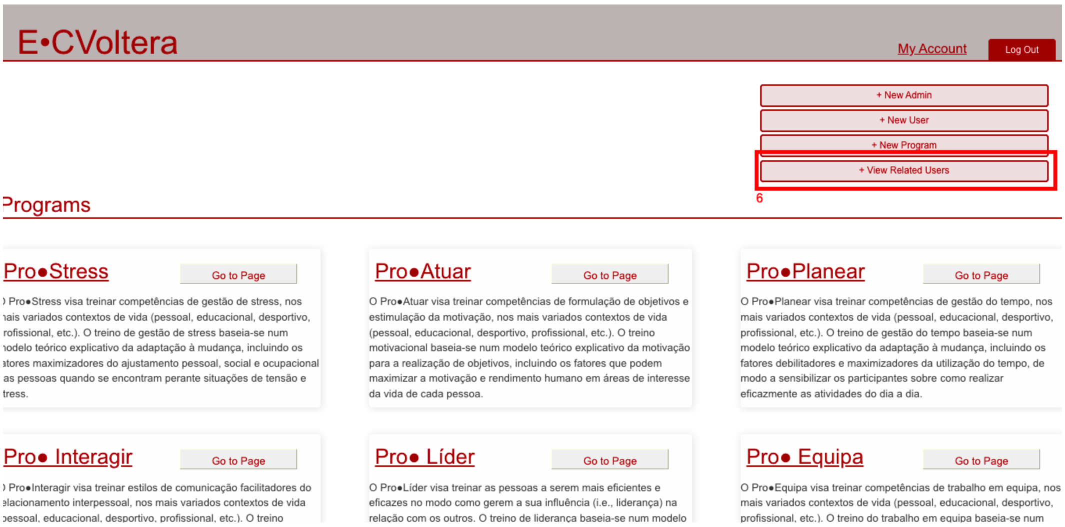
Pro● Equipa

O Pro●Equipa visa treinar competências de trabalho em equipa, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino do trabalho em equipa baseia-se num

Figure 60: E•CVoltera New User Action.

### C.1.6 *View Users*

For the user to be able to view all users registred, he must select the action *'View Users'*(marked as number 6),Figure 61.



Programs

Pro●Stress

) Pro●Stress visa treinar competências de gestão de stress, nos ıais variados contextos de vida (pessoal, educacional, desportivo, rofissional, etc.). O treino de gestão de stress baseia-se num ıodelo teórico explicativo da adaptação à mudança, incluindo os atores maximizadores do ajustamento pessoal, social e ocupacional as pessoas quando se encontram perante situações de tensão e tress.

Pro●Atuar

O Pro●Atuar visa treinar competências de formulação de objetivos e estimulação da motivação, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino motivacional baseia-se num modelo teórico explicativo da motivação para a realização de objetivos, incluindo os fatores que podem maximizar a motivação e rendimento humano em áreas de interesse da vida de cada pessoa.

Pro●Planear

O Pro●Planear visa treinar competências de gestão do tempo, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão do tempo baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores debilitadores e maximizadores da utilização do tempo, de modo a sensibilizar os participantes sobre como realizar eficazmente as atividades do dia a dia.

Pro● Interagir

) Pro●Interagir visa treinar estilos de comunicação facilitadores do elacionamento interpessoal, nos mais variados contextos de vida ɔessoal, educacional, desportivo, profissional, etc.). O treino

Pro● Líder

O Pro●Líder visa treinar as pessoas a serem mais eficientes e eficazes no modo como gerem a sua influência (i.e., liderança) na relação com os outros. O treino de liderança baseia-se num modelo

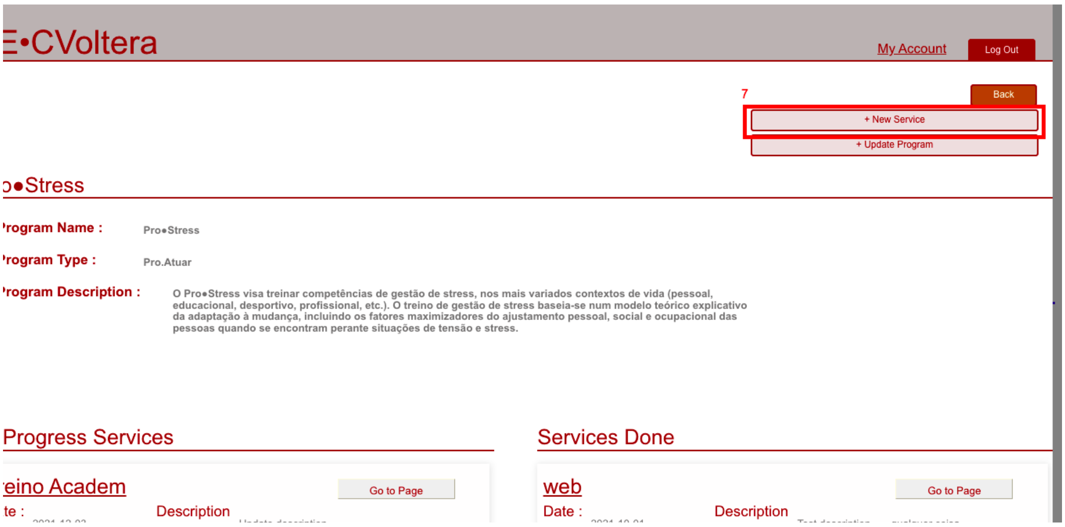
Pro● Equipa

O Pro●Equipa visa treinar competências de trabalho em equipa, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino do trabalho em equipa baseia-se num

Figure 61: E•CVOLTERA View User Action.

### C.1.7 *Create Service*

For the user to be able to create a Service, he must select the action *'Create Service'*(marked as number 7),Figure 62.



ɔ●Stress

ʼrogram Name : Pro●Stress

ʼrogram Type : Pro.Atuar

ʼrogram Description : O Pro●Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

Progress Services

ɾeino Academ

te : Description

Services Done

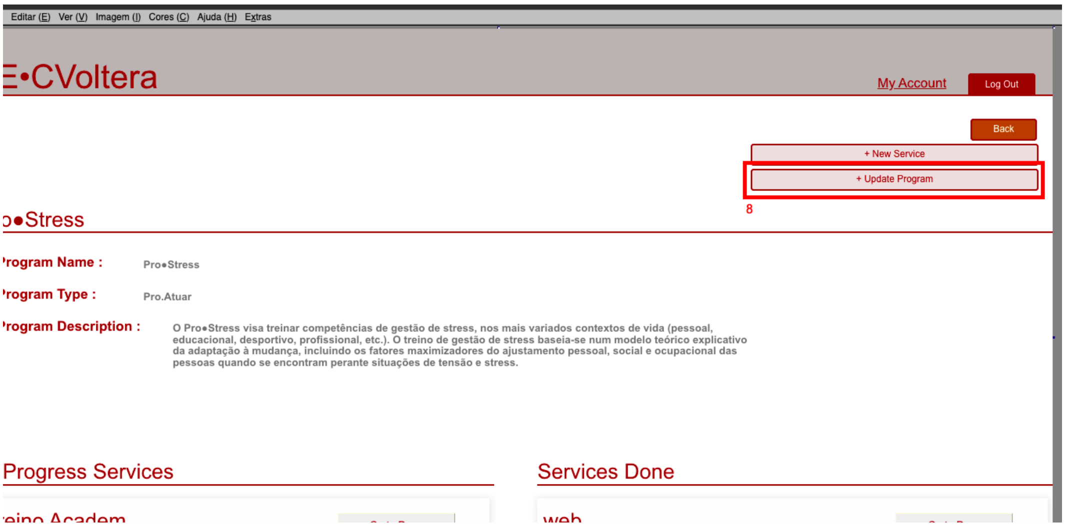
web

Date : Description

Figure 62: E•CVOLTERA Create Service Action.

### C.1.8 *Edit a Program*

For the user to be able to edit a Program, he must select the action *'Update Program'*(marked as number 8),Figure 63.



o•Stress

'rogram Name : Pro•Stress

'rogram Type : Pro.Atuar

'rogram Description : O Pro•Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

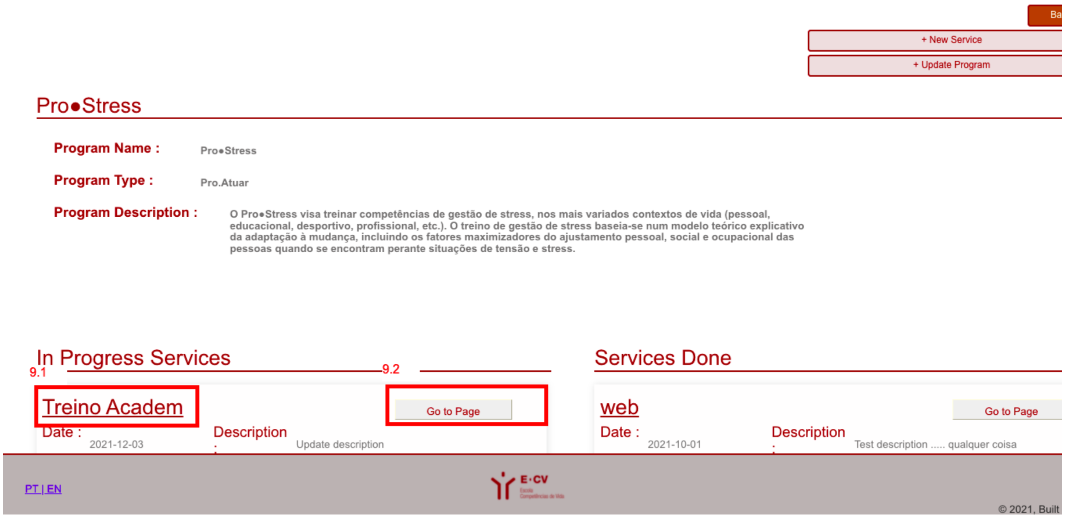
Progress Services

Services Done

Figure 63: E•CVoltera Update Program Action.

### C.1.9 *View Service*

For the user to be able to view a Service, he must select the Service Name or the action *'Go to Page'*(marked as number 9.1 and 9.2),Figure 64.



Pro•Stress

Program Name : Pro•Stress

Program Type : Pro.Atuar

Program Description : O Pro•Stress visa treinar competências de gestão de stress, nos mais variados contextos de vida (pessoal, educacional, desportivo, profissional, etc.). O treino de gestão de stress baseia-se num modelo teórico explicativo da adaptação à mudança, incluindo os fatores maximizadores do ajustamento pessoal, social e ocupacional das pessoas quando se encontram perante situações de tensão e stress.

In Progress Services

Treino Academ
Date : 2021-12-03 Description : Update description

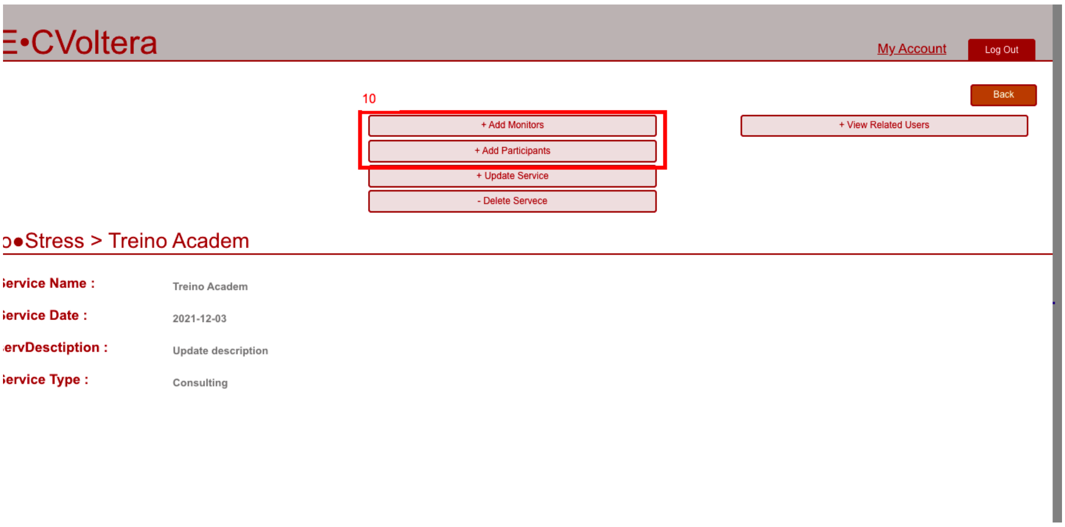
Services Done

web
Date : 2021-10-01 Description : Test description ..... qualquer coisa

Figure 64: E•CVoltera View Service Action.

### C.1.10 *Add Monitor or Participant in the Service*

For the user to be able to add a Monitor or Participant in the Service, he must select the action *'Add Monitors'* or *'Add Participants'* (marked as number 10),Figure 65.



ìervice Name : Treino Academ

ìervice Date : 2021-12-03

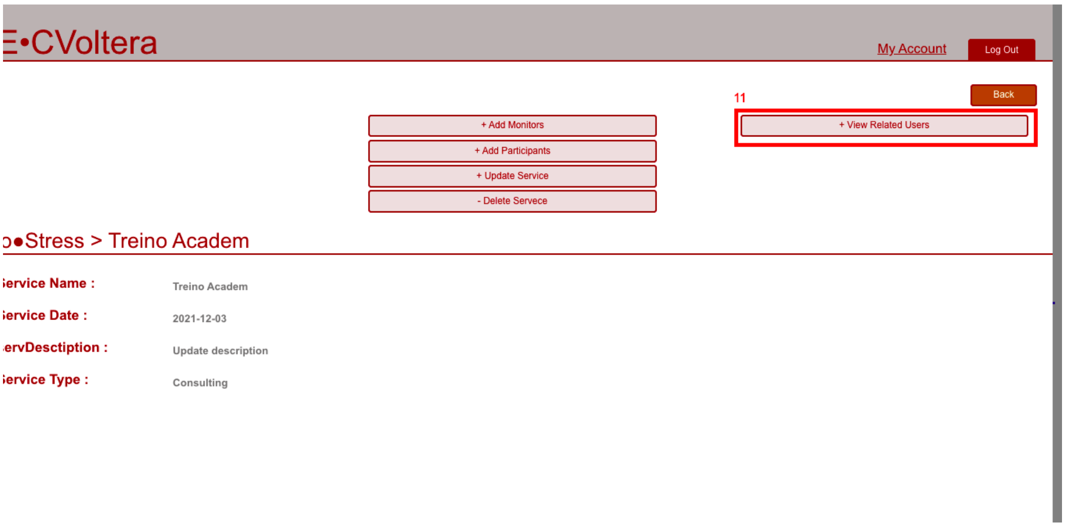
ervDesctiption : Update description

ìervice Type : Consulting

Figure 65: E•CVoltera dd Monitor or Participant in the Service Action.

### C.1.11 *View Monitors and Participants in Service*

For the user to be able to view Monitor or Participant in the Service, he must select the action *'View Related Users'*(marked as number 11),Figure 66.



ìervice Name : Treino Academ

ìervice Date : 2021-12-03

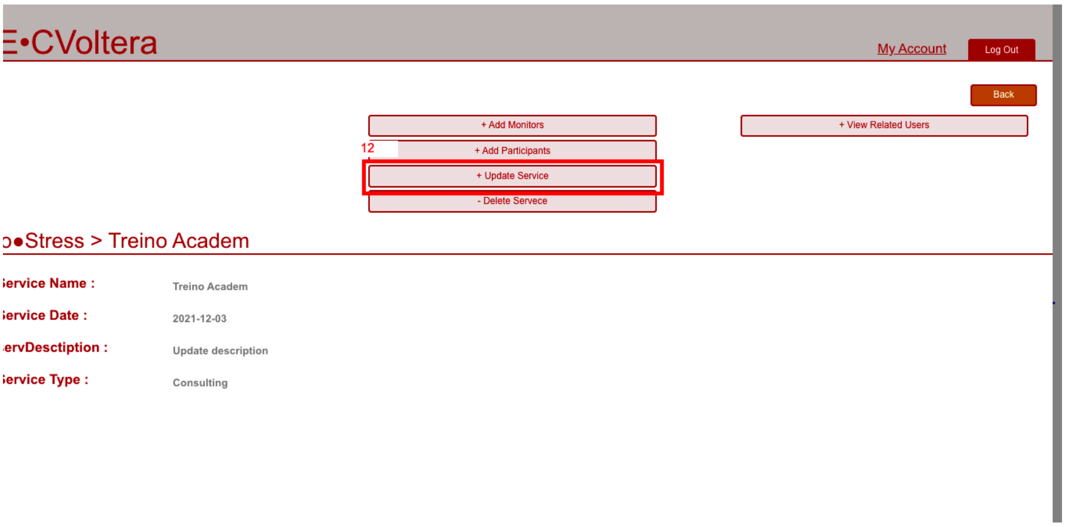
ervDesctiption : Update description

ìervice Type : Consulting

Figure 66: E•CVoltera View Monitors and Participants in Service Action.

### C.1.12 *Edit Service*

For the user to be able to edit a Service, he must select the Service Name or the action *'Update Service'*(marked as number 12),Figure 67.



ervice Name : Treino Academ

ervice Date : 2021-12-03

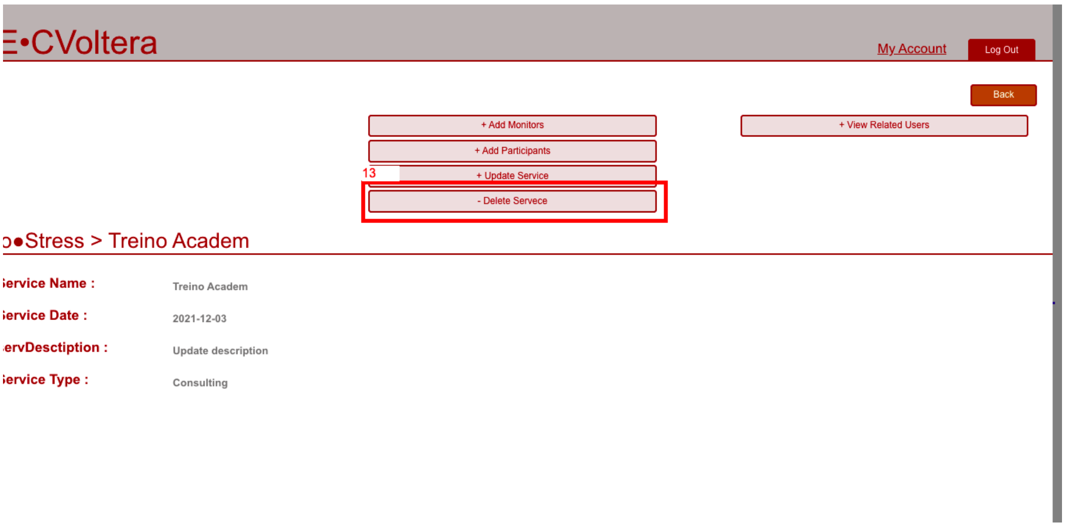
ervDesctiption : Update description

ervice Type : Consulting

Figure 67: E•CVOLTERA Edit Service Action.

### C.1.13 *Delete Service*

For the user to be able to delete a Service, he must select the Service Name or the action *'Delete Service'*(marked as number 13),Figure 68.



ervice Name : Treino Academ

ervice Date : 2021-12-03

ervDesctiption : Update description

ervice Type : Consulting

Figure 68: E•CVOLTERA Delete Service Action.

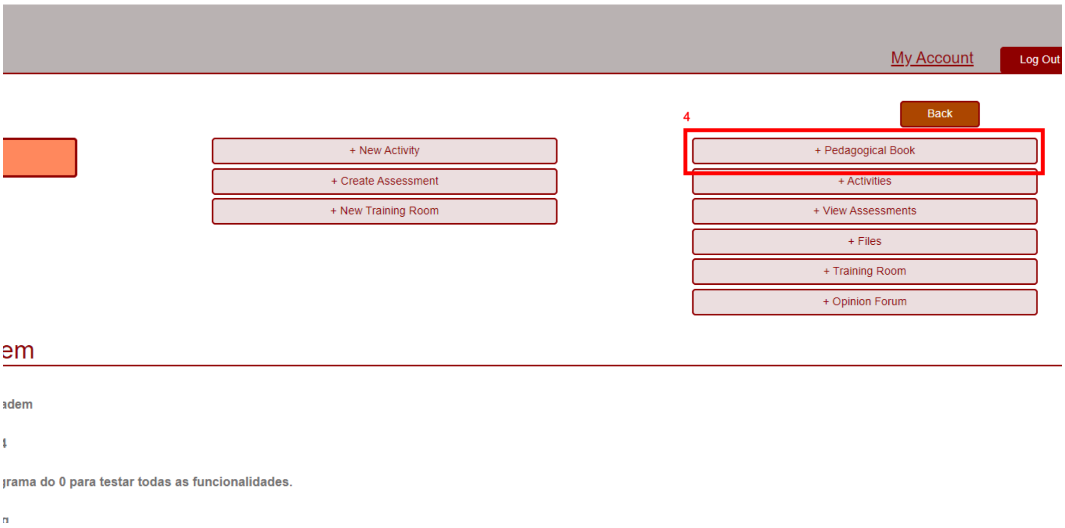
## C.2 MONITOR - FUNCTIONALITIES

An Monitor is able to perform the following actions:

1. **View My Account** (Sub-Section C.1.1);
2. **View Program** (Sub-Section C.1.3);
3. **View Service** (Sub-Section C.1.9);
4. **View Pedagogical Book** (Sub-Section C.2.1);
5. **Create Activity** (Sub-Section C.2.2);
6. **View Activity** (Sub-Section C.2.3);
7. **Create Assessment** (Sub-Section C.2.4);
8. **View Assessment** (Sub-Section C.2.5);
9. **Create Training Room** (Sub-Section C.2.6);
10. **View Training Room** (Sub-Section C.2.7);
11. **View Opinion Forum** (Sub-Section C.2.8);
12. **View Communications** (Sub-Section C.2.9);
13. **View Contents** (Sub-Section C.2.10).

### C.2.1 *View Pedagogical Book*

For the user to be able to see Pedagogical Book, he must select the action *'Pedagogical Book'*(marked as number 4),Figure 69.



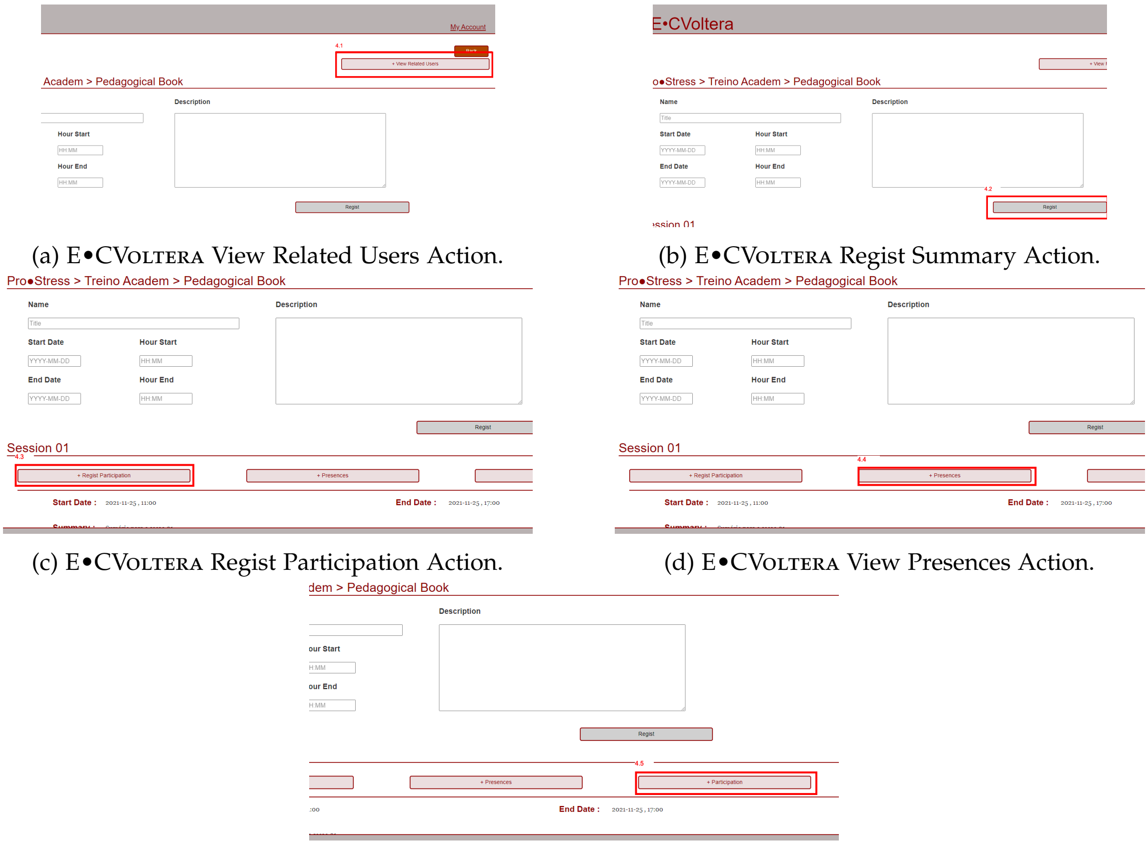
ɪdem

ɪrama do 0 para testar todas as funcionalidades.

Figure 69: E•CVoltera View Pedagogical Book Action.

As Monitor, the user can perform the following actions:

- **View Related Users** (Figure 70a);
- **Regist Summary** (Figure 70b);
- **Regist Participation** (Figure 70c);
- **View Presences** (Figure 70d);
- **View Participation** (Figure 70e).



(a) E•CVolTERA View Related Users Action.

(b) E•CVolTERA Regist Summary Action.

(c) E•CVolTERA Regist Participation Action.

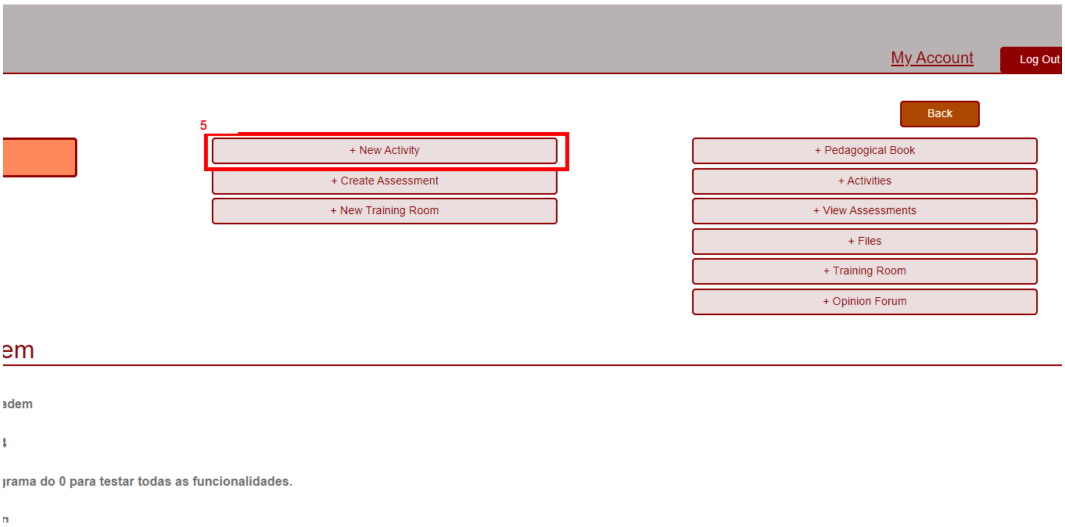
(d) E•CVolTERA View Presences Action.

(e) E•CVolTERA View Participation Action.

Figure 70: E•CVolTERA Pedagogical Book Actions.

### C.2.2 *Create Activity*

For the user to be able to create an Activity, he must select the action *'New Activity'*(marked as number 5),Figure 71.

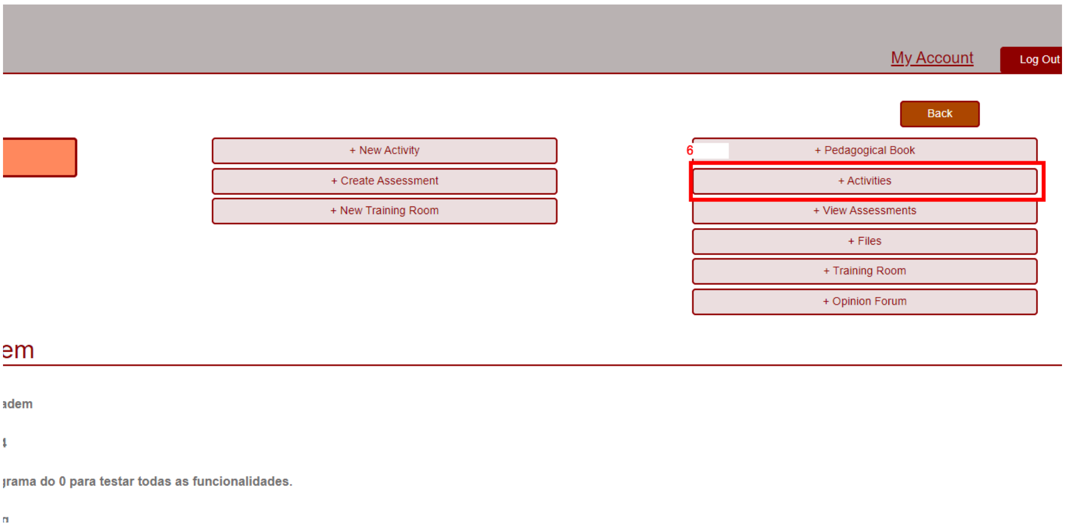


ɪrama do 0 para testar todas as funcionalidades.

Figure 71: E•CVoltera Create Activity Action.

### C.2.3 *View Activity*

For the user to be able to see Activity details, he must select the action *'Activities'*(marked as number 6), Figure 74, and select activity.

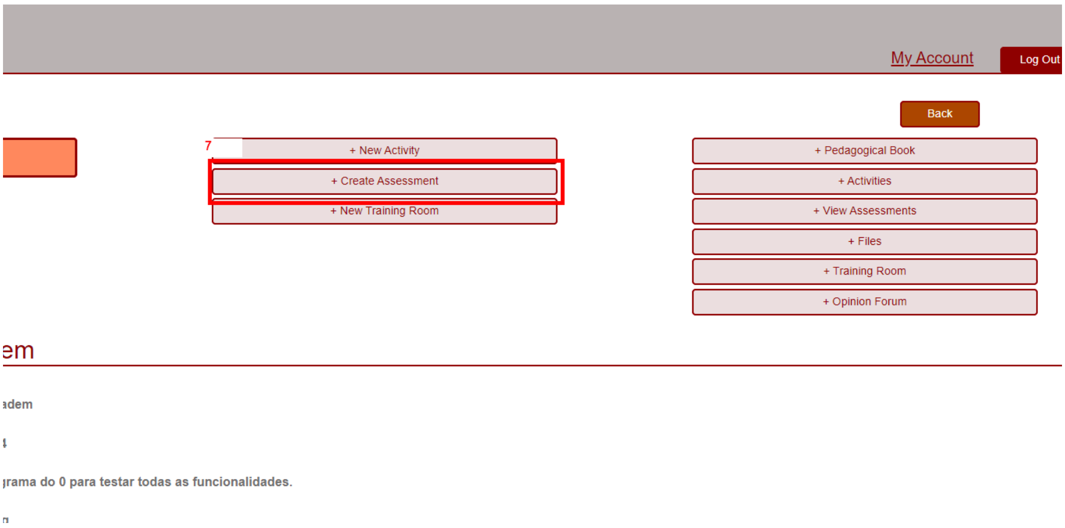


ɪrama do 0 para testar todas as funcionalidades.

Figure 72: E•CVoltera View Activity Action.

### C.2.4 *Create Assessment*

For the user to be able to create an Assessment, he must select the action *'Create Assessment'*(marked as number 7),Figure 73.

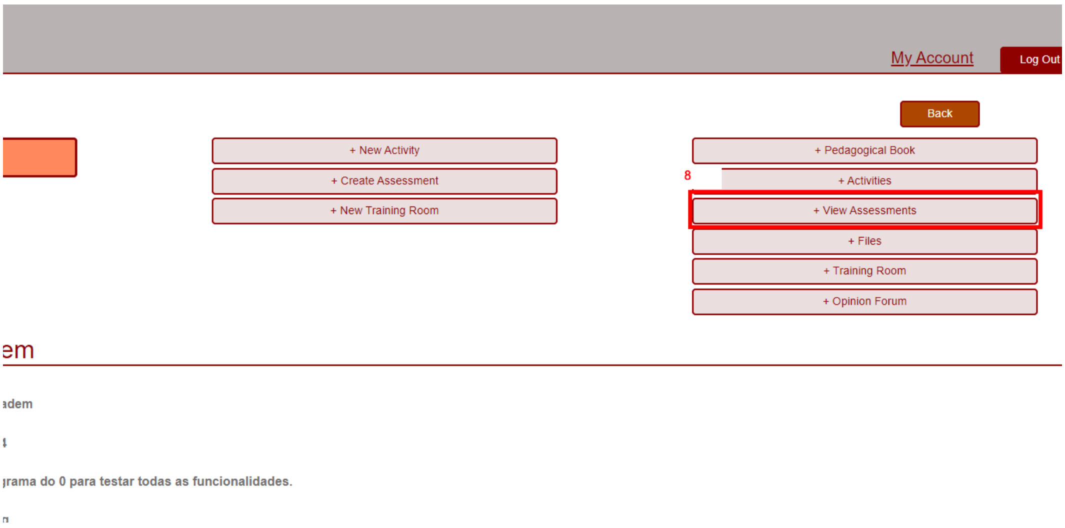


ɟrama do 0 para testar todas as funcionalidades.

Figure 73: E•CVoltera Create Assessment Action.

### C.2.5 *View Assessment*

For the user to be able to see Assessment details, he must select the action *'View Assessments'*(marked as number 8), Figure 74, and select Assessment.

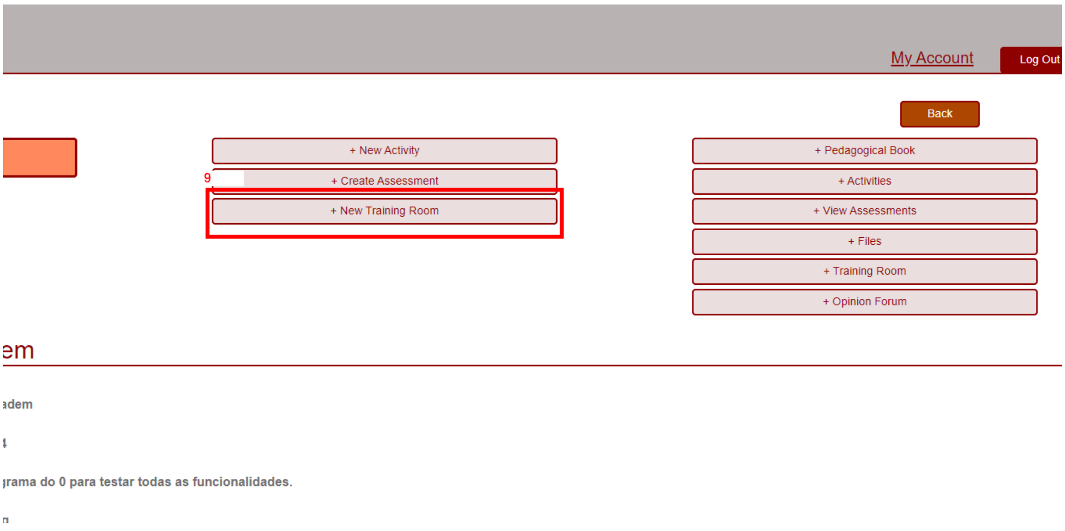


ɟrama do 0 para testar todas as funcionalidades.

Figure 74: E•CVoltera View Assessment Action.

### C.2.6 *Create Training Room*

For the user to be able to create an Training Room, he must select the action *'New Training Room'*(marked as number 9),Figure 75.

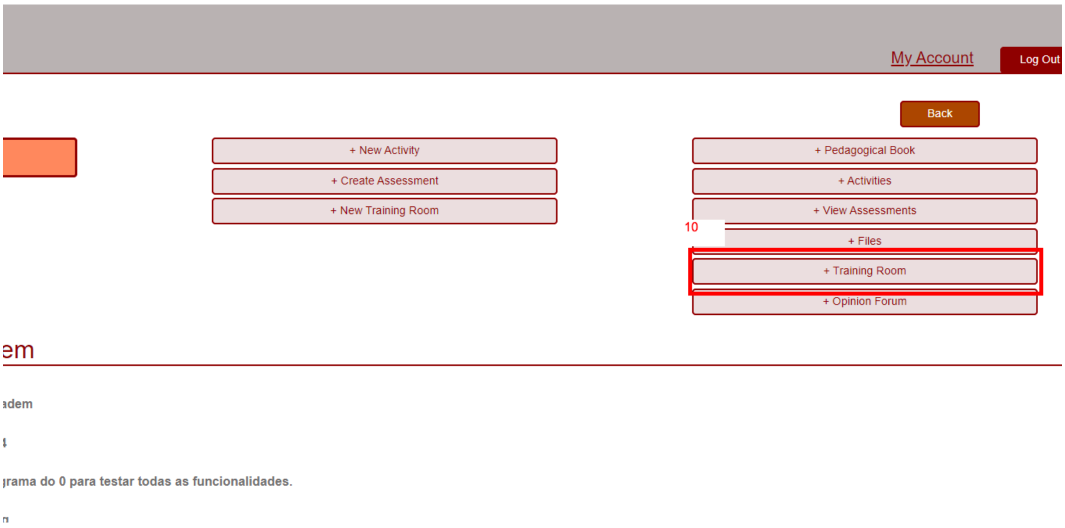


ırama do 0 para testar todas as funcionalidades.

Figure 75: E•CVoltera Create Training Room Action.

### C.2.7 *View Training Room*

For the user to be able to see all Training Rooms, he must select the action *'Training Room'*(marked as number 10), Figure 76, and select Training Room.

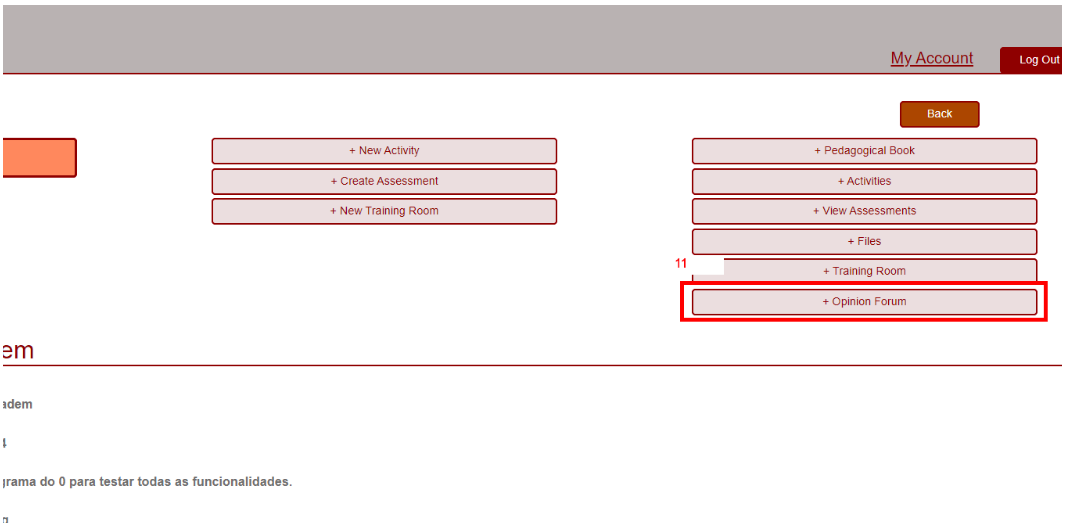


ırama do 0 para testar todas as funcionalidades.

Figure 76: E•CVoltera View Training Room Action.

### C.2.8 *View Opinion Forum*

For the user to be able to see Opinion Forum, he must select the action *'Opinion Forum'*(marked as number 11), Figure 77.



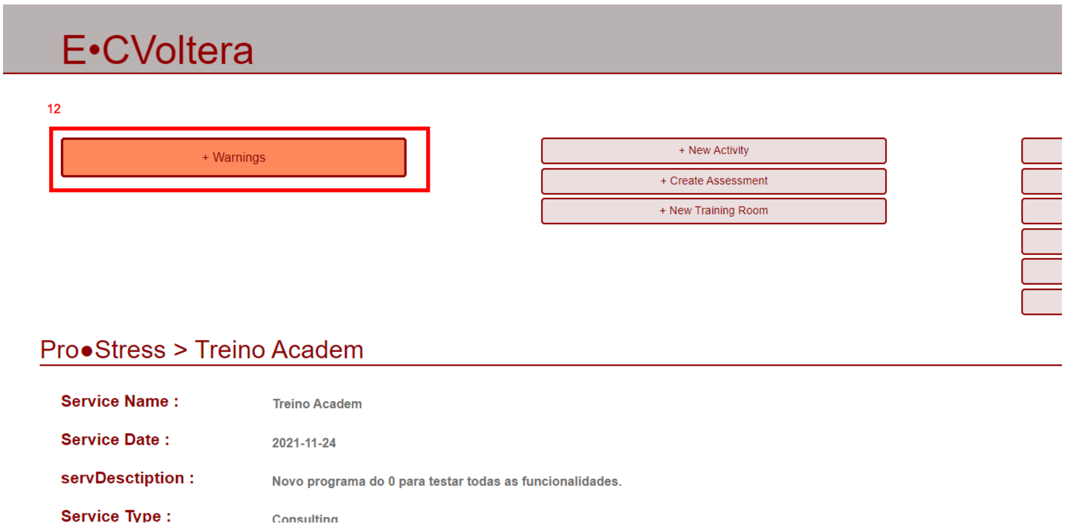
ıdem

ırama do 0 para testar todas as funcionalidades.

Figure 77: E•CVoltera View Opinion Forum Action.

### C.2.9 *View Communications*

For the user to be able to see all Communications, he must select the action *'Warnings'*(marked as number 12), Figure 79.



Service Name : Treino Academ

Service Date : 2021-11-24

servDesctiption : Novo programa do 0 para testar todas as funcionalidades.

Service Type : Consulting

Figure 78: E•CVoltera View Communications Action.

### C.2.10 *View Contents*

For the user to be able to see all Contents, he must select the action *'Files'*(marked as number 13), Figure 79.

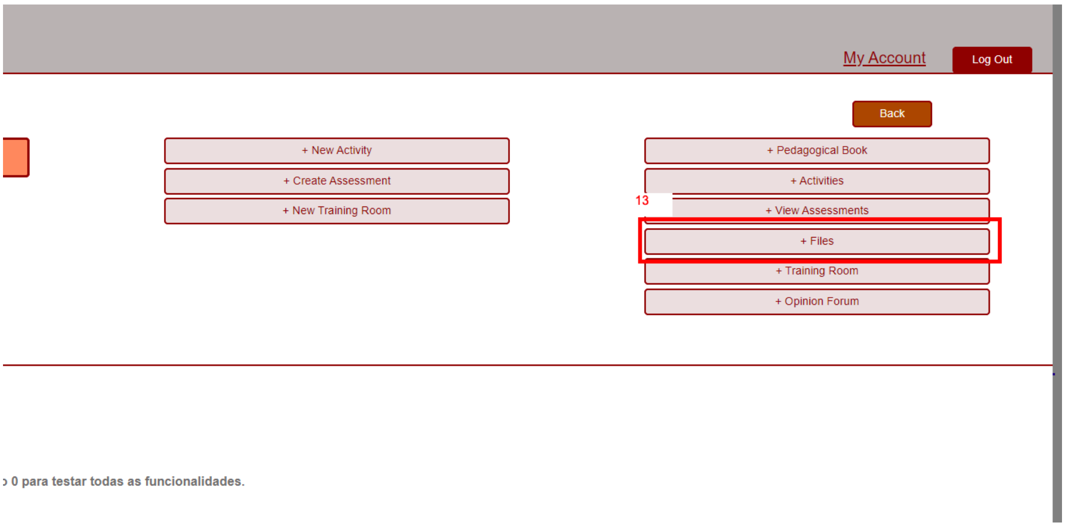


Figure 79: E•CVoltera View Contents Action.

## C.3 PARTICIPANT - FUNCTIONALITIES

All Participant pages are for informational purposes only. Useful information regarding the different components is displayed. The Participant can only enter/edit information associated with his personal data, or enter comments in the 'Opinion Forum'. Then all the functionalities are stated in the previous sections.