This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466 . This document reflects the views of the author and the European Union is not responsible for any use that may be made of the information it contains.

PULCHRA

Participatory Urban Learning Community Hubs through Research and Activation

EC Grant Agreement	No 824466
Project Acronym	PULCHRA
Project Title	Science in the City: Building Participatory Urban Learning Community Hubs through Research and Activation
Instrument	HORIZON 2020
Programme	Open schooling and collaboration on science education
Start Date of Project	01/09/2019
Duration	36 months

Deliverable 7.2 - City Challenges App

WP7	Design, development and population of the City Challenges Platform [including the web visualization platform and the app]
Due Date	31/10/2020
Submission Date	13/11/2020
Responsible Partner	NKUA
Version	1.0
Status	Final
Delivery Type	Other
Dissemination Level	Public
Authors	Corallia: Christina Garoufalia, Eliza Rozalia Milioni, Michael Papapetros, Anna Luisa Sanchez, Christos Kanellopoulos, Nektaria Berikou, Nancy Liva, Nikos Vogiatzis, Jorge-A. Sanchez-P., NKUA: Constantinos Cartalis, Thalia Mavrakou, Anastasios Polydoros

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Executive summary

This document is the report that supports *Deliverable 7.2: City Challenges App of* the PULCHRA project. The report describes all steps taken and stages implemented for the design, development, launch and release of the PULCHRA app.

Version History

Version	Date
0.1 - ToC	10/07/2020
0.2 - 1st draft of Chapters 1, 2.1-2.4 and 2.10	17/07/2020
0.3 - 2nd draft after internal and before external app testing	30/10/2020
0.4 - 3rd draft after external app testing	09/11/2020
1.0 - Final version	13/11/2020

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1. Introduction

The PULCHRA project explores the open schooling concept through the theme "Cities as urban ecosystems", in view of creating new partnerships in local communities to foster science education for all citizens.

Schools, in cooperation with other stakeholders will become agents of community well-being, by exploring the natural environment, the built environment and the socio-economic environment in cities. This is of great importance, given the urgency of cities to be approached as urban ecosystems is underestimated.

The methodology is based on pilot themes (termed City Challenges) which create know-how, built trust in the science approach based on participants own experience, facilitate skilled use of tools and support community building as they are based upon the identity of the communities in which they take place. A City Challenges Platform is developed to bridge partners, schools and stakeholders; mixed Science Teams and students acting as City Reporters will explore and disseminate the City Challenges, respectively.

Work Package 7 aims at defining the requirements of the City Challenges Platform to support open schooling and collaborations in science education, designing and developing the City Challenges Platform and app and populating the City Challenges Platform.

Task 7.5 aims at designing and developing the PULCHRA app, which will provide short information on the PULCHRA project and will allow the general public to explore more on project-related topics such as City Challenges, urban ecosystems and Sustainable Development Goals.

This document is the report that supports Deliverable 7.2: *City Challenges App* of the PULCHRA project. The current report describes all steps taken and stages implemented for the design, development, launch and release of the PULCHRA app.

The stages of the City Challenges App Development Cycle are:

1. Planning
2. Goal and Objectives
3. Functional and Non-Functional Requirements
4. Wireframes and Storyboards
5. Backend Development
6. Frontend Development
7. Testing
8. Preparing Launch
9. Release
10. Maintenance and Support

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Timetable

The timetable of the PULCHRA App Development Cycle is presented below.

App phases	Time plan
Planning	November 2019 – October 2020 (incl. corrective actions)
Goals and Objectives	March 2020 – July 2020
➔ **Feedback from Coordinator/ Deliverable Lead**	24/7/2020
Functional and Non-Functional Requirements	March 2020 – July 2020
Wireframes and Storyboards	May 2020 – July 2020
➔ **Feedback from ALL partners**	31/7/2020
Backend Development	September - October 2020
Frontend Development	September - October 2020
Testing	16/10/2020 - 06/11/2020
➔ **Feedback from Coordinator (deliverable lead), partners and potential users**	06/11/2020
Preparing Launch	November 2020
Release	Depends on time and procedures required by Play Store (Google) and App store (Apple).
Maintenance and Support	From app release until August 2022 (end of the PULCHRA project)

2. PULCHRA App Development Cycle

2.1 Planning

Planning is the first and most important step of the app development process. During the planning phase, the development activities are defined, the timeline is created, and the project team members are selected. The stages of the App development cycle that have been adopted are:

1. Planning
2. Goal and Objectives Set
3. Functional and Non-Functional Requirements Described
4. Wireframes and Storyboards Design
5. Backend Development
6. Frontend Development
7. Testing
8. Preparing Launch
9. Release (in the Play Store (Google) and App store (Apple) for download)
10. Maintenance and Support (until the end of the PULCHRA project)

The cycle includes feedback loops at various stages to improve the user acceptance, operability, and efficiency.

The last stage of the process, which is in progress, is the release of the app, making it available in the Play Store (Google) and App store (Apple) for download. Maintenance and technical support will be provided until the end of the PULCHRA project.

2.2 Goal and Objectives

The PULCHRA project targets the exploitation of the concept of open schooling in view of:

- bringing new scientific knowledge for the city as an urban ecosystem and facilitating participation of citizens of all ages in scientific discovery;
- building trust in the method of science through the own experience of participation;
- establishing concepts to recognise the strong links of the natural environment, the built environment and the socio-economic environment;
- developing knowledgeable, innovative, and participatory communities able to cope with city-scale challenges; and
- exploring common issues related to the city as an urban ecosystem through specially designed City Challenges.

The major goal of the PULCHRA app is to act as a dissemination and engagement tool on the topic of cities acting as urban ecosystems and explore targeting groups of people who do not usually engage with these types of topics.

The app will provide users with personalised and tailor-made feedback according to their preferences regarding challenges urban areas face and encourage their participation by providing them with the option to upload related posts and learn more on the issues they are interested in.

The target audience of the app is any audience that may have an interest in the City Challenges topics and in suggested solutions, in the concept of re-naturing cities using nature-based solutions and innovation actions for improving the quality of life for more sustainable and resilient cities. Therefore,

the target audience is defined as the 'general public' as an effort to attract groups of people and individuals that are not included in the other target audiences identified by the project.

2.3 Functional and Non-Functional Requirements during design phase

The Functional and Non-Functional Requirements of the app, as developed during the app design phase, are described in the following tables. It should be noted that several modifications have been applied to the following requirements to facilitate user navigation during the app development phase. The finalised requirements are presented in section 2.5. The Terms of Use of the PULCHRA app are presented in Annex 1.

Functional Requirements

ID: FR_usrAuth-001	**Description**: The first time the user opens the app, he/ she must have a sign-up option, where he/ she fills in the following information in the corresponding fields: name, email and password. If he/ she already has an account, there is a button at the bottom of the page, in order to be redirected to the sign-in option from there.
Title: Sign-up	
User groups: Non-registered users	
Priority: High	

ID: FR_usrAuth-002	**Description**: The first time the user opens the app or if he/she has previously logged out, he/she must have a sign-in option, where he/she has the ability to use the application with an already created account. The user must fill in the following information: email and password.
Title: Sign-in	
User groups: Registered users	
Priority: High	

ID: FR_usrAuth-003	**Description**: The user can also sign-up by using two alternative methods: Facebook or Google+.
Title: Alternative sign-up options	
User groups: Non-registered users	
Priority: Low	

ID: FR_usrAuth-004	**Description**: The user can retrieve his/ her password in case he/ she forgot it. Retrieval instructions will be sent to his/ her email. After the user clicks on the link in the email, he/ she received, he/ she will be redirected inside a page in the app, where he/ she must provide a new password and then repeat it for safety purposes. *Reset Password Email Template (via HTML)* From: e.g. pulchra@pulchra.org To: Me Subject: Reset your password <PULCHRA logo> Hi <user's name>, We noticed you requested to reset the password for your PULCHRA account. Please click this link to reset your password: <link that redirects user to password retrieval page inside the app>. Thank you, The PULCHRA Team If you did not request a password reset, please ignore this email. This is an automated email, please do not reply.
Title: Password Retrieval (Forgot Password)	
User groups: Registered users	
Priority: High	

ID: FR_usrAuth-005	**Description**: The app should warn the user in case he/ she fills in the fields incorrectly, for either sign-up or sign-in information. That includes: invalid-email or password (sign-in), invalid email (sign-up), invalid password (sign-up: less than 8 characters) and not ticked Terms and Conditions box (sign-up) plus the ones mentioned below (FR_usrAuth-006, FR_usrAuth-007)
Title: Invalid input handling	
User groups: ALL	
Priority: High	

ID: FR_usrAuth-006	**Description**: The user's name cannot be more than 30 characters and cannot contain the following special characters: ! @ $ % ^ & * ( )_- = [ ] { } \ | ; : " < >,. ? / +
Title: Character limitations	
User groups: Non-registered users	
Priority: Medium	

ID: FR_usrAuth-007	**Description**: The user's password must be at least 8 characters long and contain at least: 1 capital letter, 1 symbol and 1 number.
Title: Password suggestions	
User groups: Non-registered users	
Priority: Medium	

ID: FR_usrAuth-008	**Description**: The sign-up option pops-up only the first time the user opens the app. From then on, the user must be automatically redirected to the 'News Feed' page (as mentioned below).
Title: Sign-up only at first boot	
User groups: Non-registered users	
Priority: High	

ID:FR_usrAuth-009	**Description**: The user must agree to the Terms & Conditions (tick the corresponding box at sign-up).
Title: Terms & Conditions	
User groups: Non-registered users	
Priority: High	

ID: FR_usrPref-001	**Description**: The user can select from one to all SDGs from a drop-down list. Only the SDGs related to the PULCHRA project appear in the drop-down list, as shown below. ***Drop-down list content*** Goal 1: No poverty Goal 2: Zero Hunger Goal 3: Good health and well-being Goal 6: Clean water and sanitation Goal 7: Affordable and clean energy Goal 8: Decent work and economic growth Goal 9: Industry, innovation and infrastructure Goal 10: Reduced inequalities Goal 11: Sustainable cities and communities Goal 12: Responsible consumption and production Goal 13: Climate action Goal 15: Life on land
Title: SDGs Selection	
User groups: Registered users	
Priority: High	

	Goal 16: Peace, justice and strong institutions Goal 17: Partnerships for the goals All

ID: FR_usrPref-002	**Description**: The user can select from one to all Challenges from a drop-down list. ***Drop-down list content*** Challenge 1: Powering cities Challenge 2: Reforming the built environment Challenge 3: Regenerating urban space Challenge 4: Circular economy Challenge 5: Green transport and Mobility Challenge 6: Innovation All
Title: Challenges Selection	
User groups: Registered users	
Priority: High	

ID: FR_usrPref-003	**Description**: The user can select from one to all countries from a drop-down list. ***Drop-down list content*** Cyprus Czech Republic Germany Greece Ireland Italy Latvia Poland Romania Sweden All
Title: Countries Selection	
User groups: Registered users	
Priority: High	

ID: FR_usrPref-004	**Description**: The preferences selection from the drop-down lists pops-up only the first time the user uses the app.
Title: Preferences Selection only at first boot	
User groups: Registered users	
Priority: High	

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ID: FR_sldSh-001	**Description**: The slideshows of SDGs and Challenges pop-up only the first time the user uses the app. From then on, SDGs and Challenges appear at the "Insights" section (as mentioned below). As for the first slideshow with the images and text, it is viewed only once, as well.
Title: Slideshow only at first boot	
User groups: Registered users	
Priority: High	

ID: FR_sldSh-002	**Description**: The user can select a specific SDG (or Challenge) to view. When he/ she clicks on a specific icon, an Instagram story-like page opens, that contains more information about it. If he/ she wants to go back, the 'X' button must be clicked. If the user clicks again, he/ she views the remaining SDGs (or Challenges) (e.g. if the user opens the 8th SDG, he/ she will also view the remaining 17 - 8 = 9 SDGs)
Title: SDGs and Challenges Slideshow Appearance	
User groups: Registered users	
Priority: High	

ID: FR_sldSh-003	**Description**: Each slide (SDG or Challenge) must appear for 20 seconds. In case the user wants to "freeze" it, he/ she can do so by holding his/ her finger anywhere on the screen.
Title: SDGs and Challenges Slideshow Duration	
User groups: Registered users	
Priority: High	

ID: FR_genReq-001	**Description**: If the user attempts to upload a photo that exceeds **2 MBs** in size (either profile photo or photo that he/ she uploads as a post), an error message must be displayed on the screen, informing the user that the photo is not accepted.
Title: Photo size limitations	
User groups: Registered users	
Priority: High	

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ID: FR_usrProfBut-000	**Description**: This is the page that signed-in users see when they open the app. Here, the user's small profile photo, like a thumbnail (it is optional for the user to have one), name, number of his/ her posts and other people's posts are displayed.
Title: 'News Feed'	
User groups: Registered users	
Priority: High	

ID: FR_usrProfBut-001	**Description**: The '+' button redirects the user to a post creation page, where he/she can upload a photo followed by text or text only. He/she may tag SDGs, countries or Challenges. Once the user uploads a photo, this will go through a content review check and will then be published in the newsfeed section. The user will be informed of the action by a pop-up, while submitting the post.
Title: '+': New post creation	
User groups: Registered users	
Priority: High	

ID: FR_usrProfBut-001-a	**Description**: The text can be no more than 300 characters. Also, the first time the user attempts to use the camera or access the photo album, access must be granted by clicking 'OK' in the pop-up system window. After that, he is either redirected to the camera, or his/her photo album, depending on what he/she asked for.
Title: '+': New post creation: Limitations	
User groups: Registered users	
Priority: High	

ID:FR_usrProfBut-002	**Description**: The 'Profile' section is used to view and/or edit posts that a user has created in the past.
Title: 'Profile'**:** User's posts	
User groups: Registered users	
Priority: High	

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ID: FR_usrProfBut-003	**Description**: This tab contains Articles, the user's SDGs, Challenges and a button named "City Challenges Platform", which is a hyperlink that opens the platform's URL in a new browser tab. Articles that contain keywords which match with the user's Preferences are the ones displayed.
Title: 'Insights'	
User groups: Registered users	
Priority: High	

ID: FR_usrProfBut-004	**Description**: The gear button (top right corner) redirects here. The user can see his/ her profile picture, name, location and two option buttons: Account and Preferences.
Title: Settings	
User groups: Registered users	
Priority: High	

ID: FR_usrProfBut-005	**Description**: Goes to 'About' section, where the user can view the project's partners and click on their icon-hyperlink to visit their webpage. The 'More' button goes to the 'Project Abstract' page, which is text that can be read in certain languages (the ones involved in the project) by clicking on their flag icon. There is also a button named "Project Website", which is a hyperlink that opens the project's website in a new browser tab.
Title: i-Button	
User groups: Registered users	
Priority: High	

ID: FR_usrProfSet-001	**Description**: As mentioned above, there are two settings tabs for the user to click on. Each goes to a different page as explained below.
Title: Settings - two tabs: Privacy and Preferences	
User groups: Registered users	
Priority: High	

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ID: FR_usrProfSet-002	**Description**: Here, the user can change his/ her photo, name, email, password, or location. Also, a 'Log-out' functionality must be implemented, so that the user is prompted to sign-in the next time he/she opens the app.
Title: Settings' first tab: Account	
User groups: Registered users	
Priority: High	

ID: FR_usrProfSet-003	**Description**: The user can change the preferences that he/she selected the first time he/she used the app.
Title: Settings' second tab: Preferences	
User groups: Registered users	
Priority: High	

Non-Functional Requirements

ID: NFR_sp-001	**Description**: A search system must be implemented, in order to find keywords that match with the user's preferences, so that these are the ones that the user will view at the 'Articles' section.
Title: Article search	
User groups: Registered users	
Priority: Low	

ID: NFR_ge-001	**Description**: The slideshow's transition between slides must be smooth, so effects usage is suggested (e.g. react-native animation library).
Title: Responsiveness	
User groups: Registered users	
Priority: High	

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ID: NFR_ge-002	**Description**: The users' information must be secure and passwords should be encrypted.
Title: Security	
User groups: Registered users	
Priority: High	

ID: NFR_ge-003	**Description**: The app's appearance must be optimised for all mobile devices.
Title: Screen Adaption	
User groups: Registered users	
Priority: High	

ID: NFR_ge-004	**Description**: The app must make transitions between Wi-Fi and 3G/4G Network smoothly, if available, without displaying network errors if it is not mandatory.
Title: Network Coverage	
User groups: Registered users	
Priority: High	

ID: NFR_ge-005	**Description**: The user must not wait more than 5 seconds for the app to open (the display of the 'News Feed' page may only be delayed by network issues).
Title: Performance	
User groups: Registered users	
Priority: High	

ID: NFR_ge-006	**Description**: There must be a database backup for the users' accounts and for their posts, as well, to achieve data integrity.
Title: Database	
User groups: Registered users	

Priority: High	

ID: NFR_ge-007	**Description**: The app must be designed in such a way that all privacy policies are met with.
Title: Compliance with privacy laws	
User groups: Registered users	
Priority: High	

ID: NFR_ge-008	**Description**: Before the implementation of the production version of the app, careful debugging is necessary to eliminate all possible and unforeseen errors.
Title: Reliability	
User groups: Registered users	
Priority: High	

ID: NFR_ge-009	**Description**: The app's environment must be friendly. The users should be able to navigate through the app's menu with ease and icons, buttons and text must be clear.
Title: GUI's ease of use	
User groups: Registered users	
Priority: High	

ID: NFR_ge-010	**Description**: The application's language must be 'English (UK)'.
Title: App's language	
User groups: ALL	
Priority: High	

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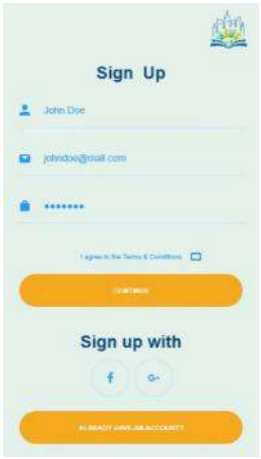
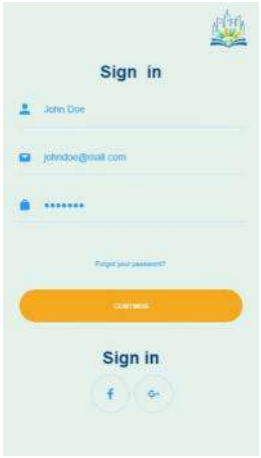
2.4 Wireframes and Storyboards during design phase

Link for feedback on Wireframes and Storyboards (mockups):

https://xd.adobe.com/view/a422a1a3-150e-42ee-ae93-23fc0cc8a73a-f171/

In the current section wireframes and storyboards are presented as designed and approved by the PULCHRA consortium prior to the app development started. The print screens of the finalised version of the app are presented in section 2.6.

Wireframes

ID: FR_usrAuth-001 **Description:** The first time the user opens the app, he/ she must have a sign-up option, where he/ she fills in the following information in the corresponding fields: name, email and password. If he/ she already has an account, there is a button at the bottom of the page, in order to be redirected to the sign-in option from there.	
ID: FR_usrAuth-002 **Description**: The first time the user opens the app or if he/she has previously logged out, he/she must have a sign-in option, where he/she has the ability to use the application with an already created account. The user must fill in the following information: email and password.	

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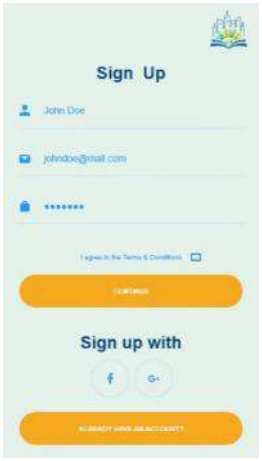
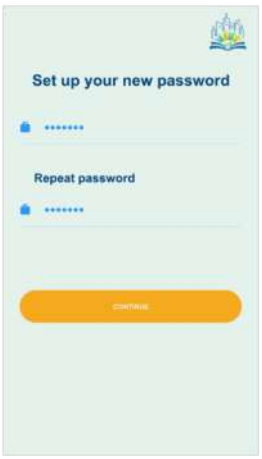
ID: FR_usrAuth-003 **Description**: The user can also sign-up by using two alternative methods: Facebook or Google+. These two options are only available in the mobile app version and not in the current web app version.	
ID: FR_usrAuth-004 **Description**: The user can retrieve his/ her password in case he/ she forgot it. Retrieval instructions will be sent to his/ her email. After the user clicks on the link in the email, he/ she received, he/ she will be redirected inside a page in the app, where he/ she must provide a new password and then repeat it for safety purposes. *Reset Password Email Template (via HTML)* From: e.g. pulchra@pulchra.org To: Me Subject: Reset your password <PULCHRA logo> Hi <user's name>, We noticed you requested to reset the password for your PULCHRA account. Please click this link to reset your password: <link that redirects user to password retrieval page inside the app>. Thank you, The PULCHRA Team If you did not request a password reset, please ignore this email. This is an automated email, please do not reply.	

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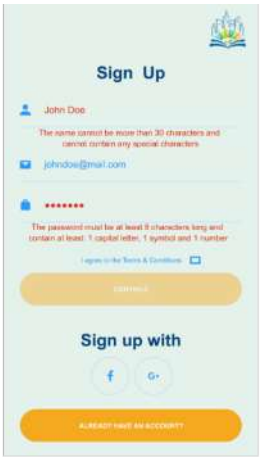
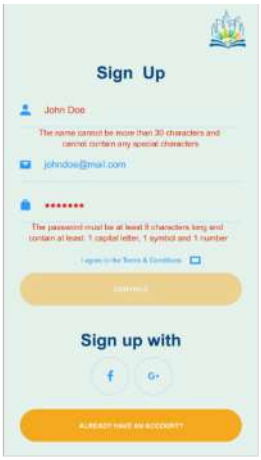
Description: The app should warn the user in case he/ she fills in the fields incorrectly, for either sign-up or sign-in information. That includes: invalid-email or password (sign-in), invalid email (sign-up), invalid password (sign-up: less than 8 characters) and not ticked Terms and Conditions box (sign-up) plus the ones mentioned below (FR_usrAuth-006, FR_usrAuth-007)	
ID: FR_usrAuth-006 **Description**: The user's name cannot be more than 30 characters and cannot contain the following special characters: ! @ $ % ^ & * ( )_- = [ ] { } \ | ; : ” < >,. ? / + **ID**: FR_usrAuth-007 **Description**: The user's password must be at least 8 characters long and contain at least: 1 capital letter, 1 symbol and 1 number.	
ID: FR_usrAuth-008 **Description**: The sign-up option pops-up only the first time the user opens the app. From then on, the user must be automatically redirected to the 'News Feed' page (as mentioned below).	

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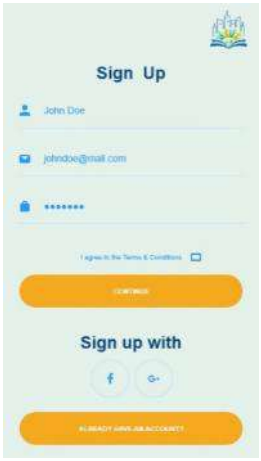
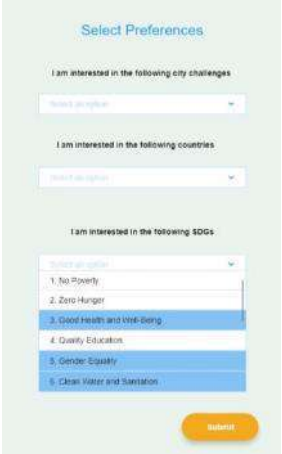
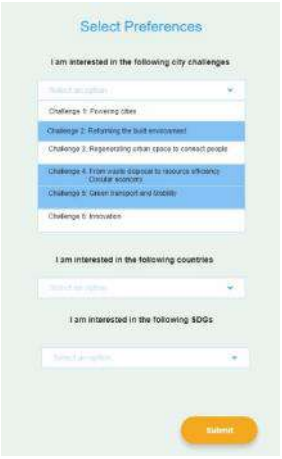
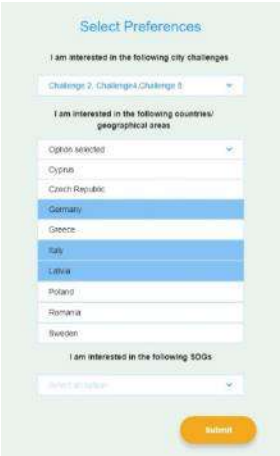
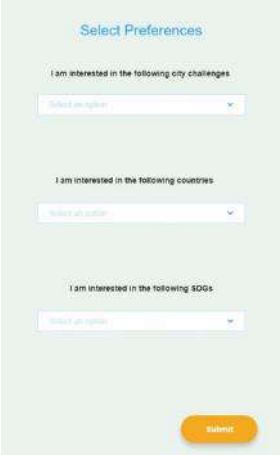
ID:FR_usrAuth-009 **Description**: The user must agree to the Terms & Conditions (tick the corresponding box at sign-up).	
Description: The user can select from one to all SDGs from a drop-down list. Only the SDGs related to the PULCHRA project appear in the drop-down list, as shown below. ***Drop-down list content*** Goal 1: No poverty Goal 2: Zero Hunger Goal 3: Good health and well-being Goal 6: Clean water and sanitation Goal 7: Affordable and clean energy Goal 8: Decent work and economic growth Goal 9: Industry, innovation and infrastructure Goal 10: Reduced inequalities Goal 11: Sustainable cities and communities Goal 12: Responsible consumption and production Goal 13: Climate action Goal 15: Life on land Goal 16: Peace, justice and strong institutions Goal 17: Partnerships for the goals All	
ID: FR_usrPref-002 **Description**: The user can select from one to all Challenges from a drop-down list. ***Drop-down list content*** Challenge 1: Powering cities Challenge 2: Reforming the built environment Challenge 3: Regenerating urban space Challenge 4: Circular economy Challenge 5: Green transport and Mobility Challenge 6: Innovation All	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_usrPref-003 **Description**: The user can select from one to all countries from a drop-down list. ***Drop-down list content*** Cyprus Czech Republic Germany Greece Ireland Italy Latvia Poland Romania Sweden All	
ID: FR_usrPref-004 **Description**: The preferences selection from the drop-down lists pops-up only the first time the user uses the app.	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_sldSh-001

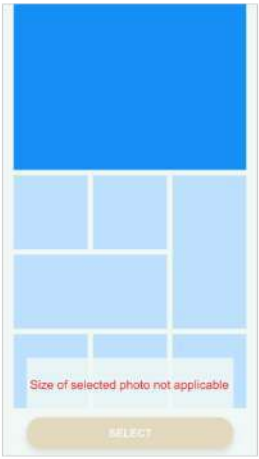
Description: The slideshows of SDGs and Challenges pop-up only the first time the user uses the app. From then on, SDGs and Challenges appear at the "Insights" section (as mentioned below). As for the first slideshow with the images and text, it is viewed only once, as well.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

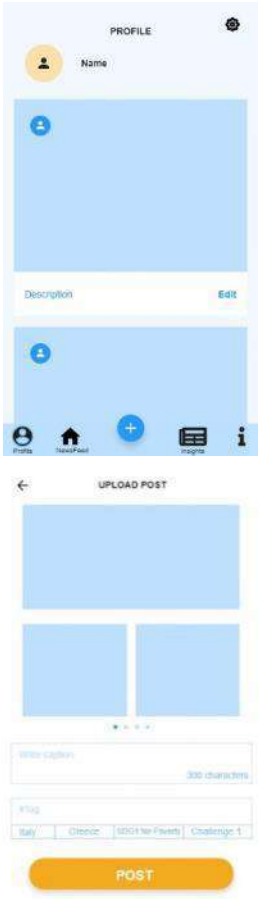
ID: FR_sldSh-002

Description: The user can select a specific SDG (or Challenge) to view. When he/ she clicks on a specific icon, an Instagram story-like page opens, that contains more information about it. If he/ she wants to go back, the 'X' button must be clicked. If the user clicks again, he/ she views the remaining SDGs (or Challenges) (e.g. if the user opens the 8th SDG, he/ she will also view the remaining 17 - 8 = 9 SDGs).

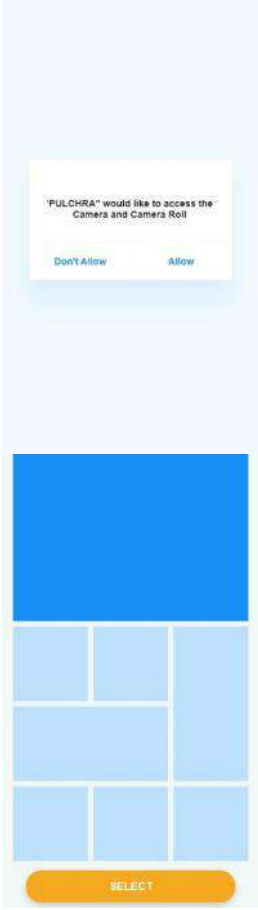
Do you want to know more about the PULCHRA City Challenges?
Challenge 1
Powering cities
Challenge 2
Reforming the built environment
Challenge 3
Regenerating urban space to connect people
Challenge 4
From waste disposal to resource efficiency
Circular economy
Challenge 5
Green transport and Mobility
Challenge 6
Innovation
Continue
Challenge 1
One of the main targets of the European Green Deal is renewable energies to account for 32% of energy production by 2030. Clean energy production along with the underestimated energy efficiency and energy saving should play a major role towards this direction. Therefore, there is a strong need to push for Climate Neutral Cities, yet important questions are still to be answered; what improvements are necessary to improve energy efficiency at the city scale? How do we introduce renewable energy in the city operation? How should we shape our energy mix to avoid problems related to instability of some of the renewable energy sources? Is coal or nuclear power perceived as recommended solutions for providing energy?

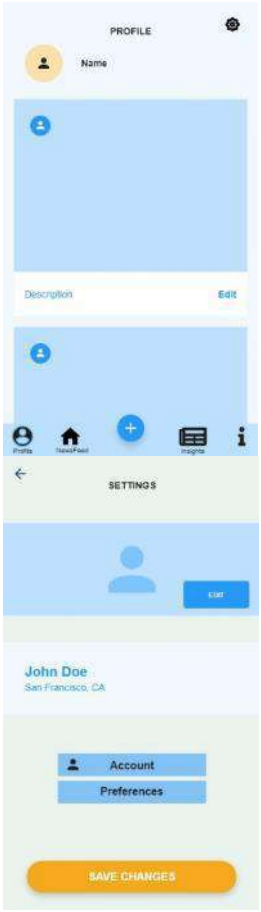
ID: FR_sldSh-003 **Description**: Each slide (SDG or Challenge) must appear for 5 seconds. In case the user wants to "freeze" it, he/ she can do so by holding his/ her finger anywhere on the screen.	
ID: FR_genReq-001 **Description**: If the user attempts to upload a photo that exceeds **2 MBs** in size (either profile photo or photo that he/ she uploads as a post), an error message must be displayed on the screen, informing the user that the photo is not accepted.	

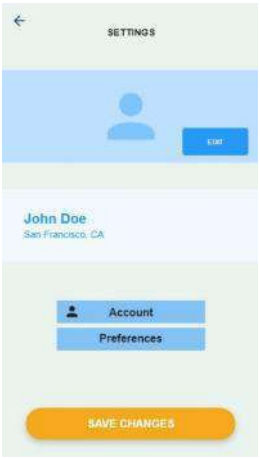
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_usrProfBut-000 **Description**: This is the page that signed-in users see when they open the app. Here, the user's small profile photo, like a thumbnail (it is optional for the user to have one), name, number of his/ her posts and other people's posts are displayed.	
ID: FR_usrProfBut-001 **Description**: The '+' button redirects the user to a post creation page, where he/she can upload a photo followed by text or text only. He/she may tag SDGs, countries or Challenges. Once the user uploads a photo, this will go through a content review check and will then be published in the newsfeed section. The user will be informed of the action by a pop-up, while submitting the post.	

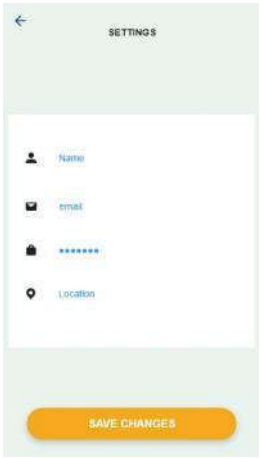
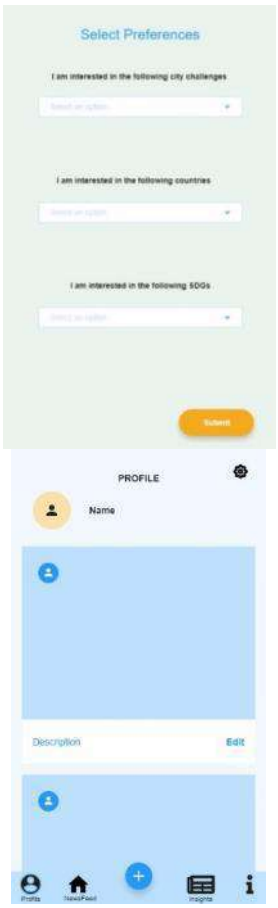
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID:FR_usrProfBut-001-a **Description**: The text can be no more than 300 characters. Also, the first time the user attempts to use the camera or access the photo album, access must be granted by clicking 'OK' in the pop-up system window. After that, he is either redirected to the camera, or his/her photo album, depending on what he/she asked for.	
ID:FR_usrProfBut-002 **Description**: The 'Profile' section is used to view and/or edit posts that a user has created in the past.	

ID: FR_usrProfBut-003 This tab contains Articles, the user's SDGs, Challenges and a button named "City Challenges Platform", which is a hyperlink that opens the platform's URL in a new browser tab. Articles that contain keywords which match with the user's Preferences are the ones displayed.	
ID: FR_usrProfBut-004 **Description**: The gear button (top right corner) redirects here. The user can see his/ her profile picture, name, location and two option buttons: Account and Preferences.	

ID: FR_usrProfBut-005 **Description**: Goes to 'About' section, where the user can view the project's partners and click on their icon-hyperlink to visit their webpage. The 'More' button goes to the 'Project Abstract' page, which is text that can be read in certain languages (the ones involved in the project) by clicking on their flag icon. There is also a button named "Project Website", which is a hyperlink that opens the project's website in a new browser tab.	
ID: FR_usrProfSet-001 **Description**: As mentioned above, there are two settings tabs for the user to click on. Each goes to a different page as explained below.	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_usrProfSet-002 **Description**: Here, the user can change his/ her photo, name, email, password, or location. Also, a 'Log-out' functionality must be implemented, so that the user is prompted to sign-in the next time he/she opens the app.	
ID: FR_usrProfSet-003 **Description**: The user can change the preferences that he/she selected the first time he/she used the app.	

First pop-up window, active for 3''	
Slideshow with teaser texts	

Slideshow with teaser texts	
Slide-show with intro text regarding preferences	

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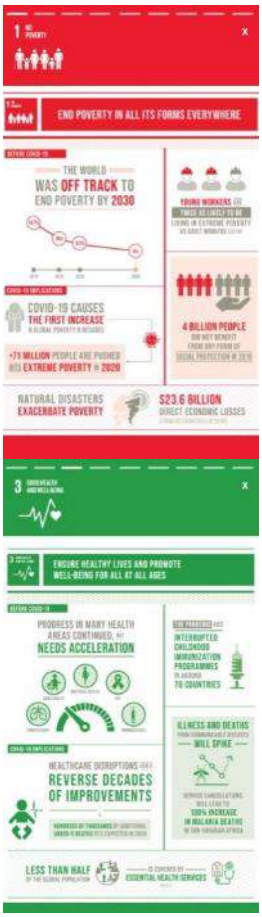
Slide-show, 17 Sustainable Development Goals presented	

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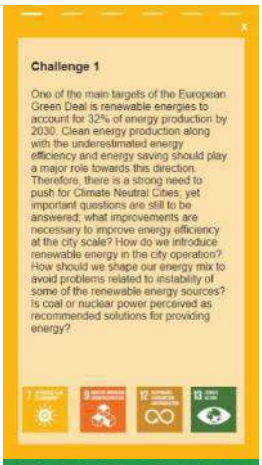
Slide-show, 6 City Challenges described	

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Storyboards

First Slideshow - Flow

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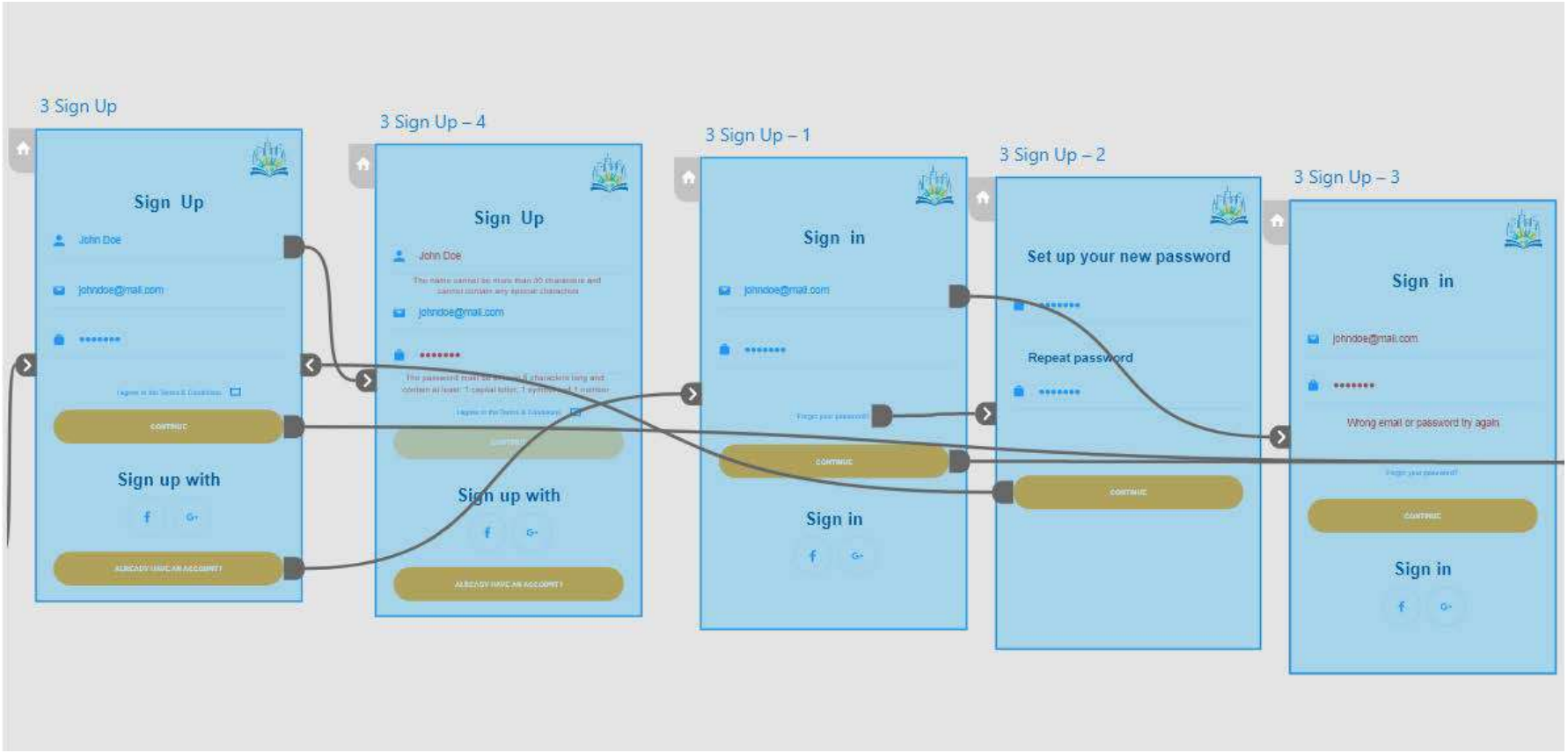
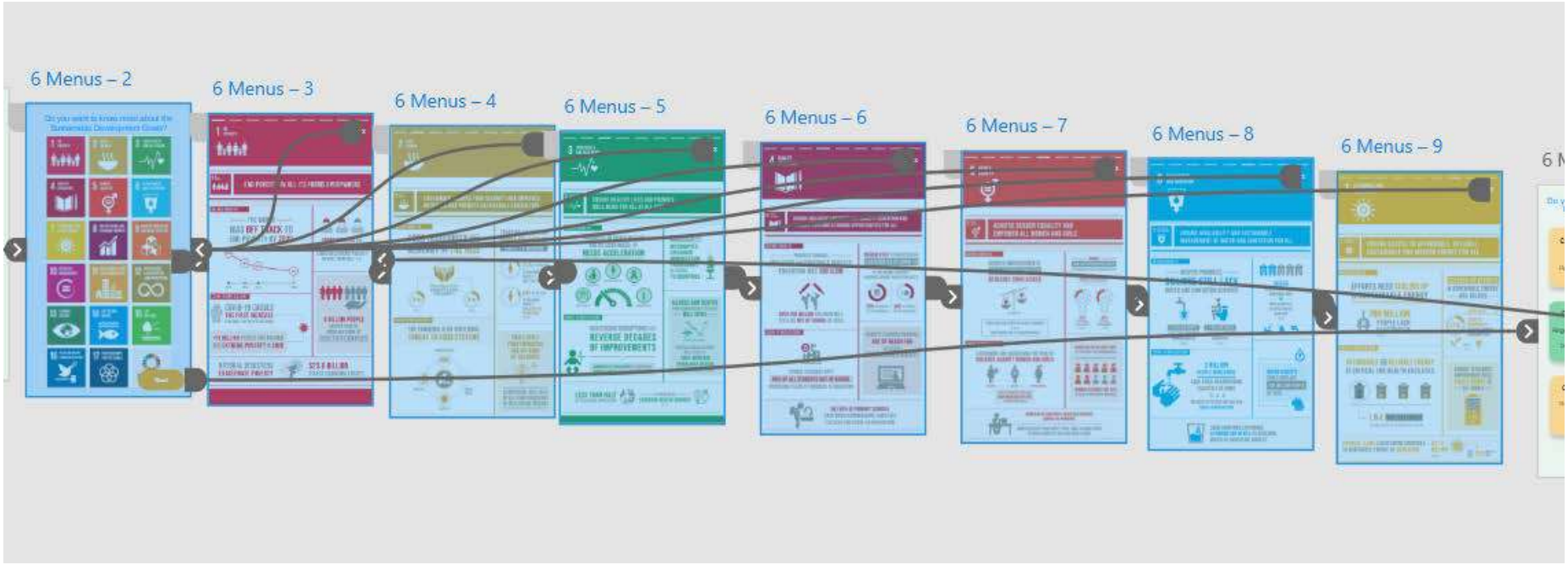
Sign-in/ Sign-up options - Flow



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

SDGs Stories - Flow



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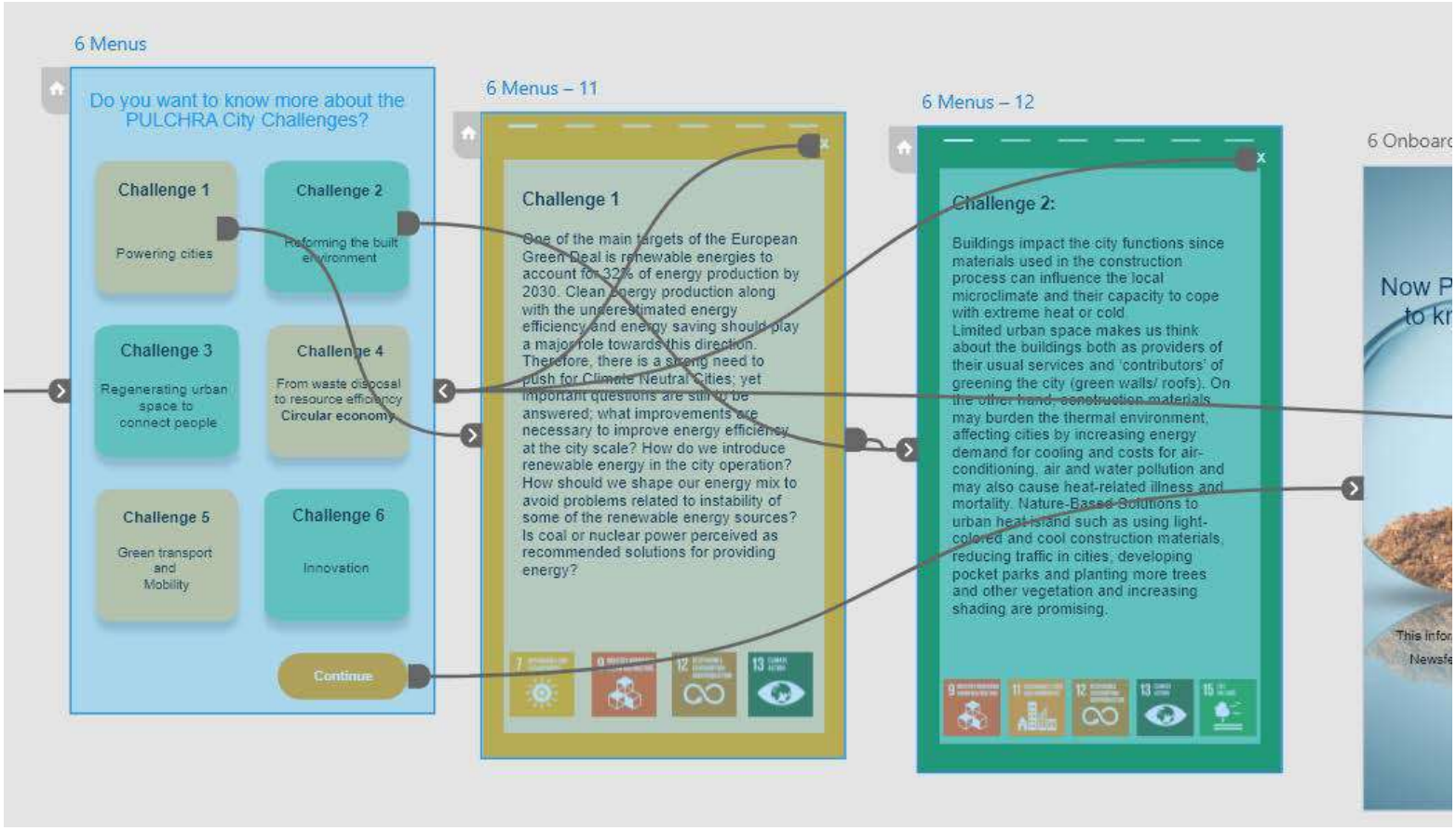
Challenges Stories - Flow



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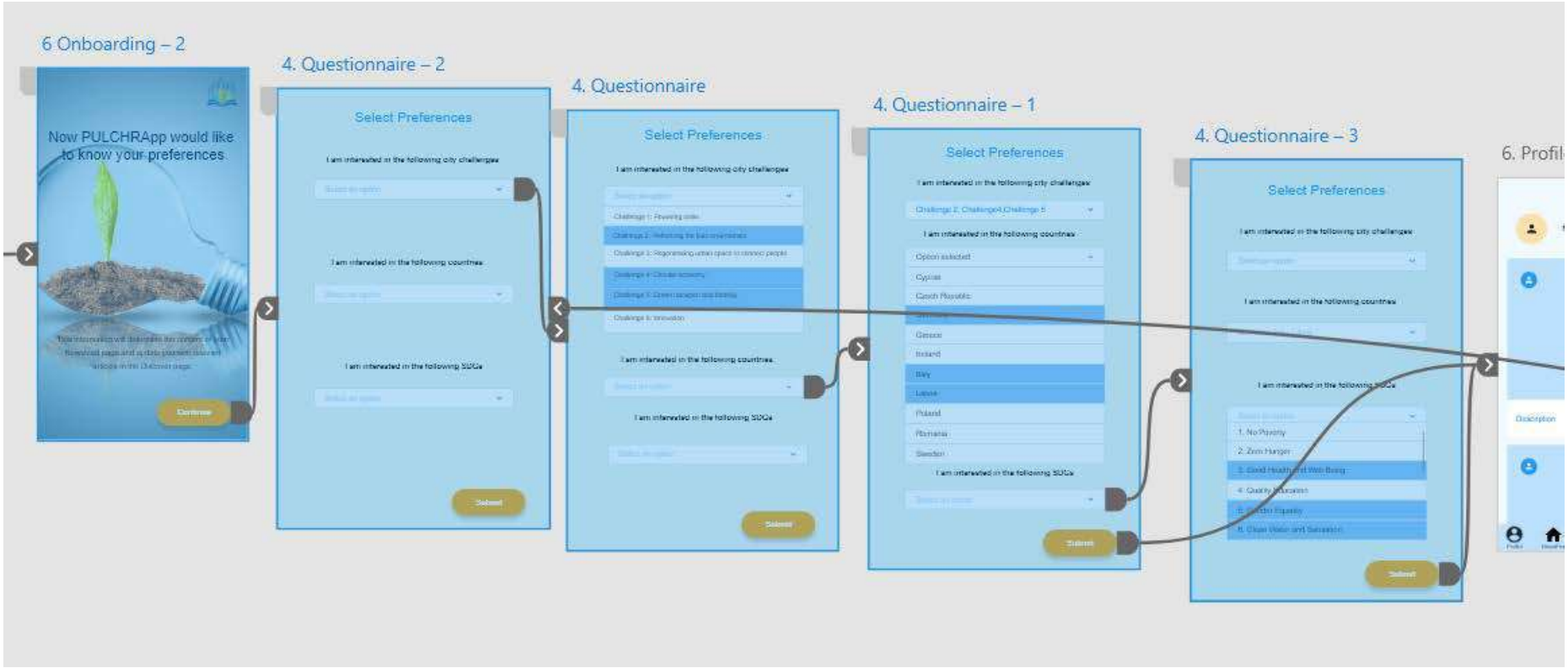
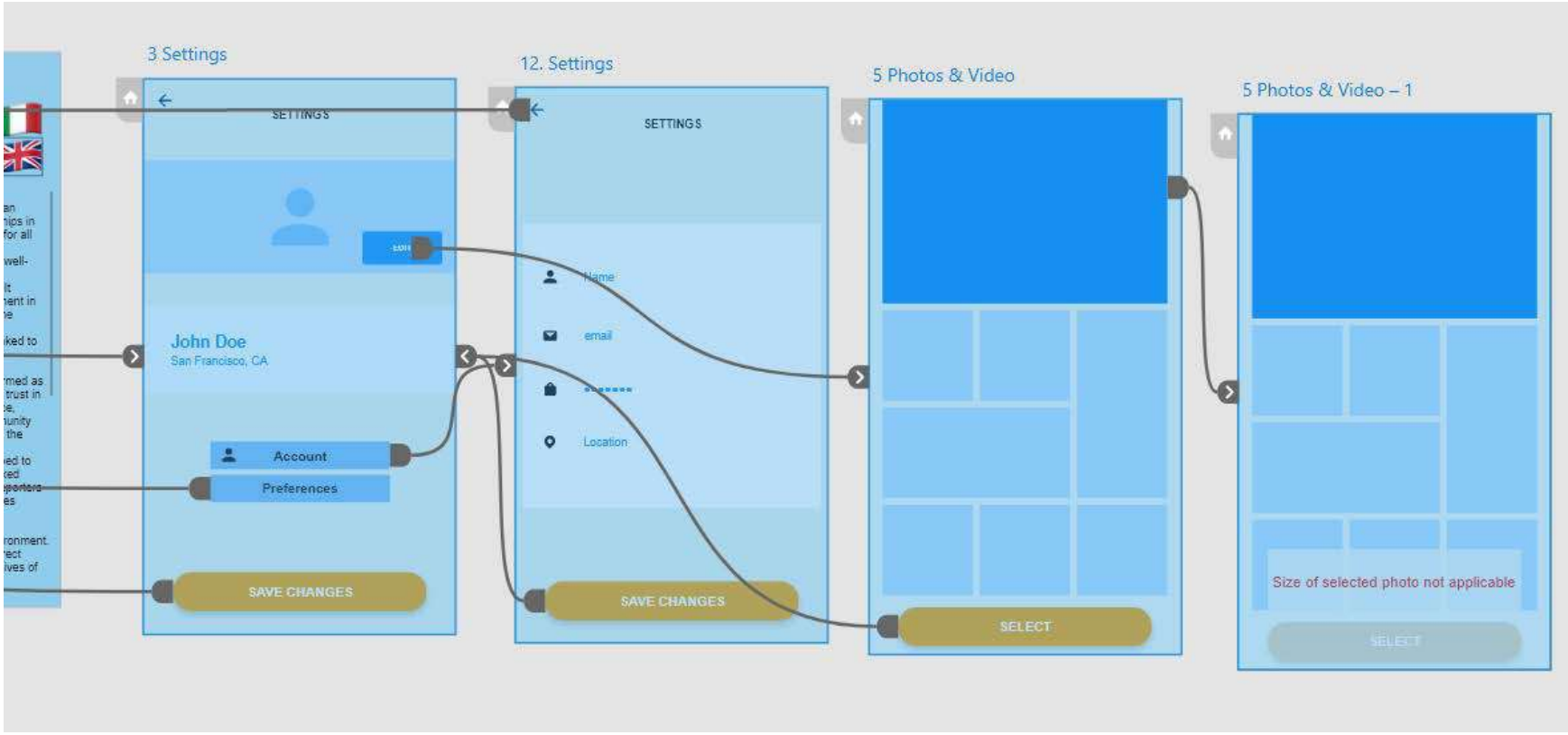
Preferences Selection - Flow



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

Settings - Flow



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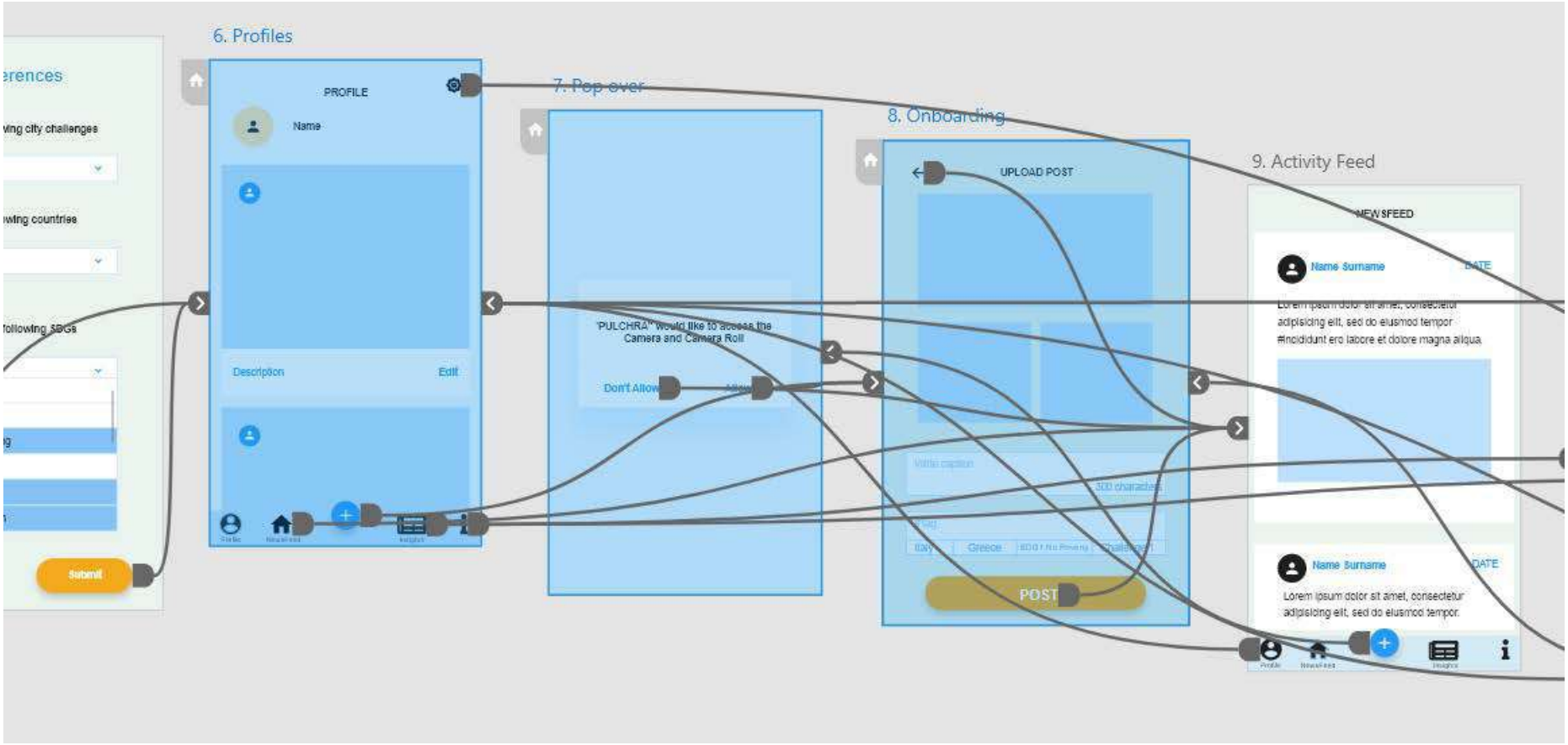
Uploading post - Flow



App Features - Flow

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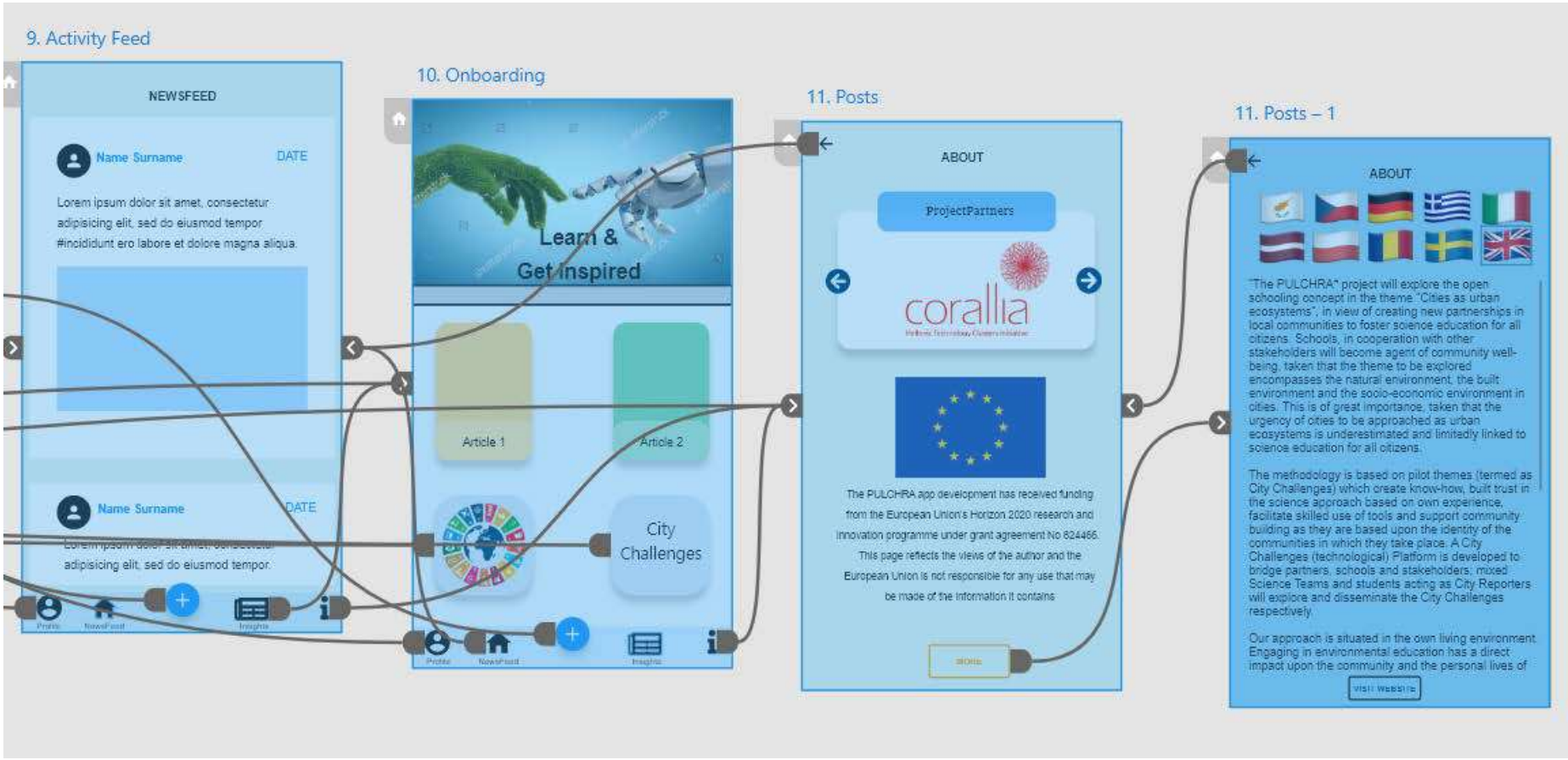

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2.5 Final Functional and Non-Functional Requirements

During the development phase, several modifications were made to the functional and non-functional requirements to improve the navigation feeling and facilitate the user in total. The finalised requirements are presented below.

ID: FR_usrAuth-001	**Description**: The first time the user opens the app, he/ she must have a sign-up option, where he/ she fills in the following information in the corresponding fields: first name, last name, email, password, retype password and location. If he/ she already has an account, there is a button at the bottom of the page, to be redirected to the sign-in option from there.
Title: Sign-up	
User groups: Non-registered users	
Priority: High	

ID: FR_usrAuth-002	**Description**: The first time the user opens the app or if he/she has previously logged out, he/she must have a sign-in option, where he/she has the ability to use the application with an already created account. The user must fill in the following information: email and password.
Title: Sign-in	
User groups: Registered users	
Priority: High	

ID: FR_usrAuth-003	**Description**: The user can also sign-up by using two alternative methods: Facebook or Google+. These two options are only available in the mobile app version and not in the current web app version.
Title: Alternative sign-up options	
User groups: Non-registered users	
Priority: Low	

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ID: FR_usrAuth-004	**Description**: The user can retrieve his/ her password in case he/ she forgot it. Retrieval instructions will be sent to his/ her email. After the user clicks on the link in the email, he/ she received, he/ she will be redirected inside a page in the app, where he/ she must provide a new password and then repeat it for safety purposes. *Reset Password Email Template (via HTML)* From: e.g. pulchra@pulchra.org To: Me Subject: Reset your password <Pulchra logo> Hi <user's name>, We noticed you requested to reset the password for your Pulchra account. Please click this link to reset your password: <link that redirects user to password retrieval page inside the app>. Thank you, The Pulchra Team If you did not request a password reset, please ignore this email. This is an automated email, please do not reply.
Title: Password Retrieval (Forgot Password)	
User groups: Registered users	
Priority: High	

ID: FR_usrAuth-005	**Description**: The app should warn the user in case he/ she fills in the fields incorrectly, for either sign-up or sign-in information. That includes: invalid-email or password (sign-in), invalid email (sign-up), invalid password (sign-up: less than 8 characters) and not ticked Terms and Conditions box (sign-up) plus the ones mentioned below (FR_usrAuth-006, FR_usrAuth-007)
Title: Invalid input handling	
User groups: ALL	
Priority: High	

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ID: FR_usrAuth-006	**Description**: The user's name cannot be more than 30 characters and cannot contain the following special characters: ! @ $ % ^ & * ( )_- = [ ] { } \ | ; : " < >,. ? / +
Title: Character limitations	
User groups: Non-registered users	
Priority: Medium	

ID: FR_usrAuth-007	**Description**: The user's password must be at least 8 characters long and contain at least: 1 capital letter and 1 number.
Title: Password suggestions	
User groups: Non-registered users	
Priority: Medium	

ID: FR_usrAuth-008	**Description**: The sign-up option pops-up only the first time the user opens the app. From then on, the user must be automatically redirected to the 'News Feed' page (as mentioned below).
Title: Sign-up only at first boot	
User groups: Non-registered users	
Priority: High	

ID:FR_usrAuth-009	**Description**: The user must agree to the Terms & Conditions (tick the corresponding box at sign-up).
Title: Terms & Conditions	
User groups: Non-registered users	
Priority: High	

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ID: FR_usrPref-001	**Description**: The user can select from one to all SDGs from a drop-down list. Only the SDGs related to the PULCHRA project appear in the drop-down list, as shown below. ***Drop-down list content*** Select all SDG1 No Poverty SDG2 Zero Hunger SDG3 Health SDG6 Waterandsanitation SDG7 Energy SDG8 Economic Growth SDG9 Infrastructureandindustrialisation SDG10 Inequality SDG11 Cities SDG12 Consumptionandproduction SDG13 Climate action SDG15 Lifeonland SDG16 Peaceandjustice SDG17 Partnership
Title: SDGs Selection	
User groups: Registered users	
Priority: High	

ID: FR_usrPref-002	**Description**: The user can select from one to all Challenges from a drop-down list. ***Drop-down list content*** Select all CC1 Powering cities CC2 Built Environment CC3 Urban Space CC4 Circular economy CC5 Green transport CC6 Innovation
Title: Challenges Selection	
User groups: Registered users	
Priority: High	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_usrPref-003	**Description**: The user can select from one to all countries from a drop-down list. ***Drop-down list content*** Select all Cyprus Czech Republic Germany Greece Ireland Italy Latvia Poland Romania Sweden
Title: Countries Selection	
User groups: Registered users	
Priority: High	

ID: FR_usrPref-004	**Description**: The preferences selection from the drop-down lists pops-up only the first time the user uses the app.
Title: Preferences Selection only at first boot	
User groups: Registered users	
Priority: High	

ID: FR_sldSh-001	**Description**: The slideshows of SDGs and Challenges pop-up only the first time the user uses the app. From then on, SDGs and Challenges appear at the "Insights" section (as mentioned below). As for the first slideshow with the images and text, it is viewed only once, as well.
Title: Slideshow only at first boot	
User groups: Registered users	
Priority: High	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_sldSh-002	**Description**: The user can select a specific SDG (or Challenge) to view. The user may stay for as long as he/ she wishes and go back to view another SDG (or Challenge).
Title: SDGs and Challenges Slideshow Appearance	
User groups: Registered users	
Priority: High	

ID: FR_sldSh-003	**Description**: Each slide (SDG or Challenge) must appear for 5 seconds. In case the user wants to "freeze" it, he/ she can do so by holding his/ her finger anywhere on the screen.
Title: SDGs and Challenges Slideshow Duration	
User groups: Registered users	
Priority: High	

ID: FR_genReq-001	**Description**: If the user attempts to upload a photo that exceeds **2 MBs** in size (either profile photo or photo that he/ she uploads as a post), an error message must be displayed on the screen, informing the user that the photo is not accepted.
Title: Photo size limitations	
User groups: Registered users	
Priority: High	

ID: FR_usrProfBut-000	**Description**: This is the page that signed-in users see when they open the app. Here, the user's small profile photo, like a thumbnail (it is optional for the user to have one), name, posts and other people's posts are displayed.
Title: 'News Feed'	
User groups: Registered users	
Priority: High	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_usrProfBut-001	**Description**: The '+' button redirects the user to a post creation page, where he/she can upload a photo followed by text or text only. He/she may tag SDGs, countries or Challenges. Once the user uploads a photo, this will go through a content review check and will then be published in the newsfeed section. The user will be informed of the action by a pop-up, while submitting the post.
Title: '+': New post creation	
User groups: Registered users	
Priority: High	

ID: FR_usrProfBut-001-a	**Description**: The text can be no more than 300 characters. Also, the first time the user attempts to use the camera or access the photo album, access must be granted by clicking 'OK' in the pop-up system window. After that, he is either redirected to the camera, or his/her photo album, depending on what he/she asked for. The user will be informed of the action by a pop-up, while submitting the post.
Title: '+': New post creation: Limitations	
User groups: Registered users	
Priority: High	

ID:FR_usrProfBut-002	**Description**: The 'Profile' section is used to view posts that a user has created in the past.
Title: 'Profile'**:** User's posts	
User groups: Registered users	
Priority: High	

ID: FR_usrProfBut-003	**Description**: This tab contains Articles, the user's SDGs, Challenges and a button named "City Challenges", which is a hyperlink that opens the platform's URL in a new browser tab. Articles that contain keywords which match with the user's Preferences are the ones displayed.
Title: 'Insights'	
User groups: Registered users	
Priority: High	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_usrProfBut-004	**Description**: The gear button (top right corner) redirects here. The user can see his/ her profile picture, name, location and two option buttons: Account and Preferences.
Title: Settings	
User groups: Registered users	
Priority: High	

ID: FR_usrProfBut-005	**Description**: Goes to 'About' section, where the user can view the project's partners and click on their icon-hyperlink to visit their webpage. The 'More' button goes to the 'Project Abstract' page, which is text that can be read in certain languages (the ones involved in the project) by clicking on their flag icon. There is also a button named "Visit Website", which is a hyperlink that opens the project's website in a new browser tab.
Title: i-Button	
User groups: Registered users	
Priority: High	

ID: FR_usrProfSet-001	**Description**: As mentioned above, there are two settings tabs for the user to click on. Each goes to a different page as explained below.
Title: Settings - two tabs: Privacy and Preferences	
User groups: Registered users	
Priority: High	

ID: FR_usrProfSet-002	**Description**: Here, the user can change his/ her photo, name, email, password, or location. Also, a 'Log-out' functionality must be implemented, so that the user is prompted to sign-in the next time he/she opens the app.
Title: Settings' first tab: Account	
User groups: Registered users	
Priority: High	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: FR_usrProfSet-003	**Description**: The user can change the preferences that he/she selected the first time he/she used the app.
Title: Settings' second tab: Preferences	
User groups: Registered users	
Priority: High	

Non-Functional Requirements

ID: NFR_sp-001	**Description**: A search system must be implemented, to find keywords that match with the user's preferences, so that these are the ones that the user will view at the 'Articles' section.
Title: Article search	
User groups: Registered users	
Priority: Low	

ID: NFR_ge-001	**Description**: The slideshow's transition between slides must be smooth, so effects usage is suggested (e.g. react-native animation library).
Title: Responsiveness	
User groups: Registered users	
Priority: High	

ID: NFR_ge-002	**Description**: The users' information must be secure and passwords should be encrypted.
Title: Security	
User groups: Registered users	
Priority: High	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

ID: NFR_ge-003	**Description**: The app's appearance must be optimised for all mobile devices.
Title: Screen Adaption	
User groups: Registered users	
Priority: High	

ID: NFR_ge-004	**Description**: The app must make transitions between Wi-Fi and 3G/4G Network smoothly, if available, without displaying network errors if it is not mandatory.
Title: Network Coverage	
User groups: Registered users	
Priority: High	

ID: NFR_ge-005	**Description**: The user must not wait more than 5 seconds for the app to open (the display of the 'News Feed' page may only be delayed by network issues).
Title: Performance	
User groups: Registered users	
Priority: High	

ID: NFR_ge-006	**Description**: There must be a database backup for the users' accounts and for their posts, as well, to achieve data integrity.
Title: Database	
User groups: Registered users	
Priority: High	

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ID: NFR_ge-007	**Description**: The app must be designed in such a way that all privacy policies are met with.
Title: Compliance with privacy laws	
User groups: Registered users	
Priority: High	

ID: NFR_ge-008	**Description**: Before the implementation of the production version of the app, careful debugging is necessary to eliminate all possible and unforeseen errors.
Title: Reliability	
User groups: Registered users	
Priority: High	

ID: NFR_ge-009	**Description**: The app's environment must be friendly. The users should be able to navigate through the app's menu with ease and icons, buttons and text must be clear.
Title: GUI's ease of use	
User groups: Registered users	
Priority: High	

ID: NFR_ge-010	**Description**: The application's language must be 'English (UK)'.
Title: App's language	
User groups: ALL	
Priority: High	

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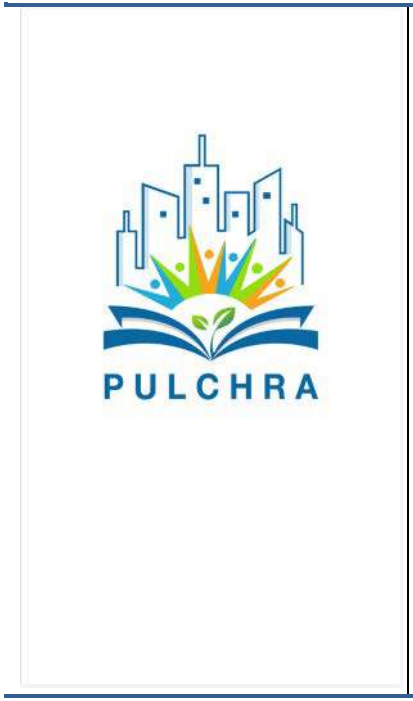
2.6 Final app screenshots

First Slideshow



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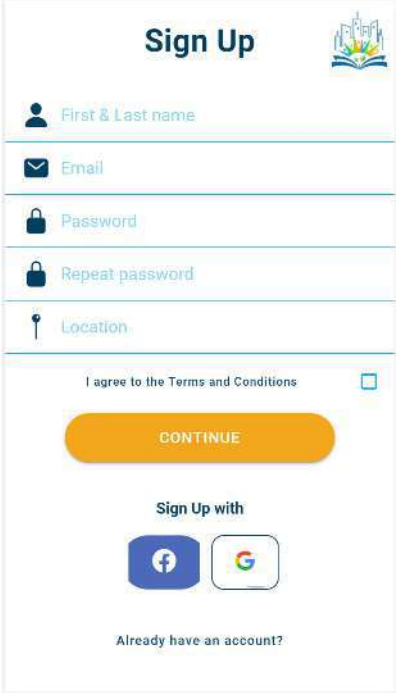
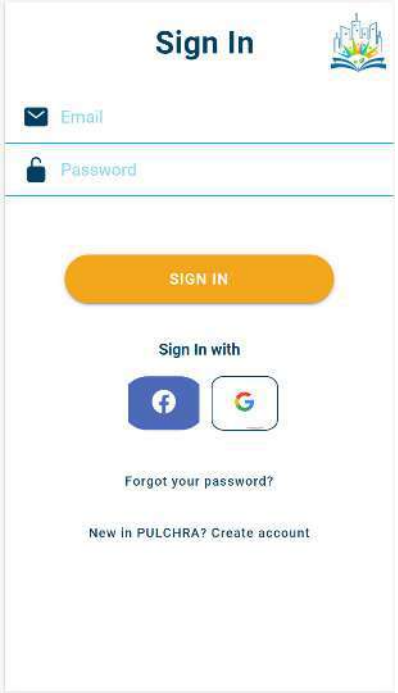
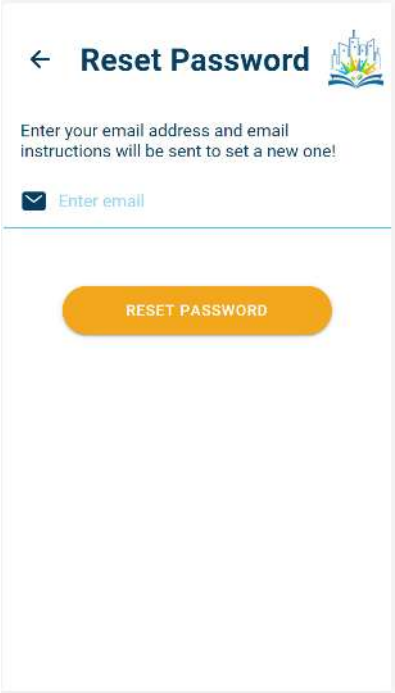
Sign-in/ Sign-up options







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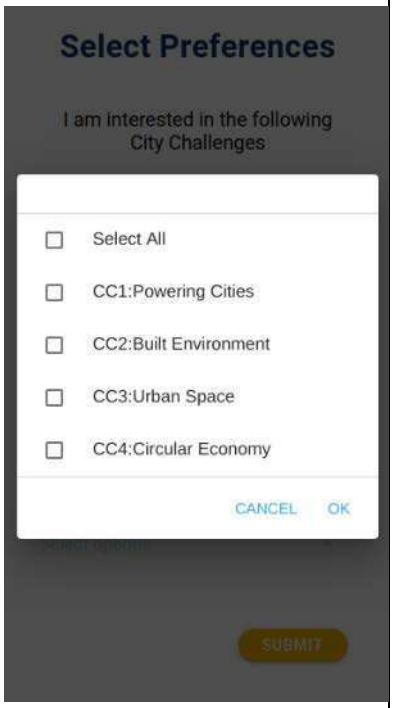
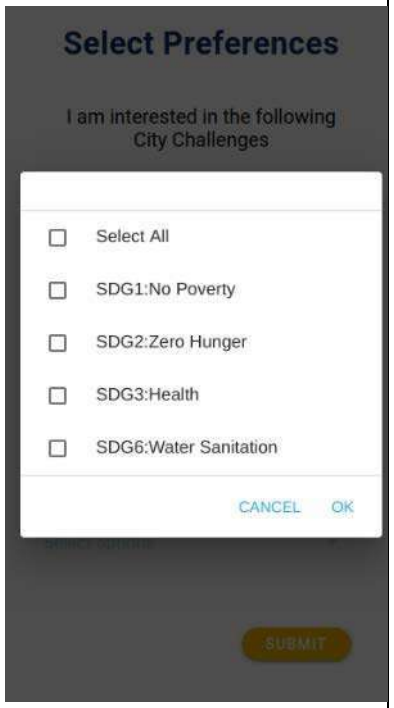
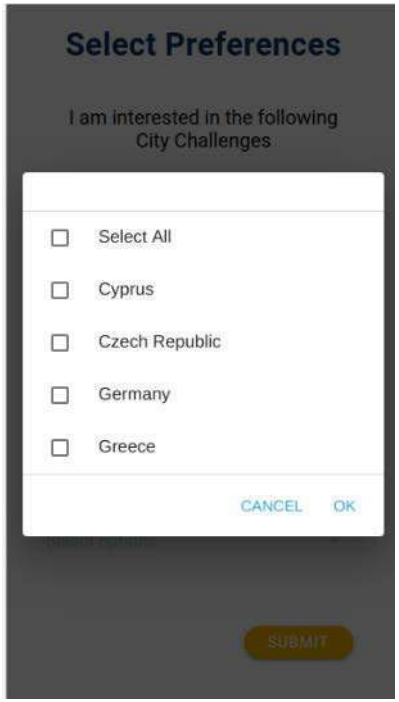
Preferences Selection

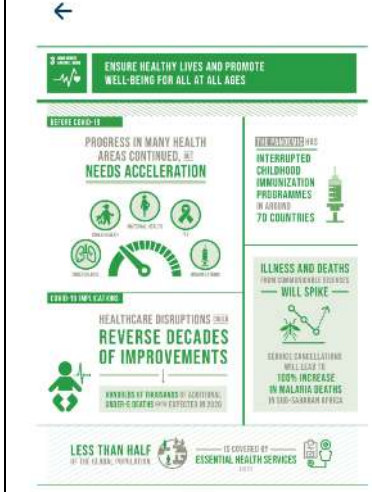


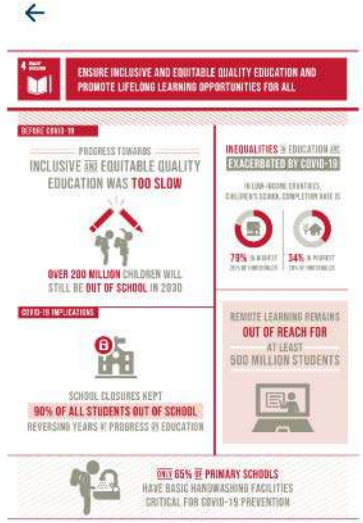




This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

SDGs overview





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SDGs overview

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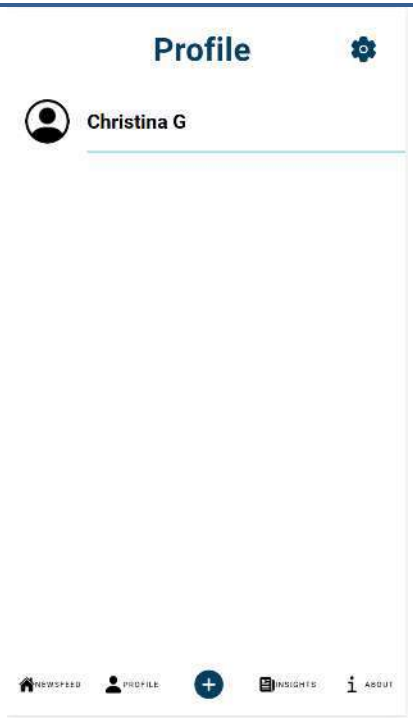
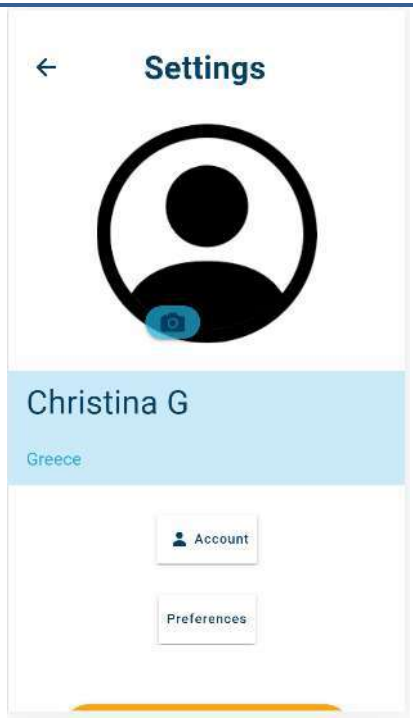
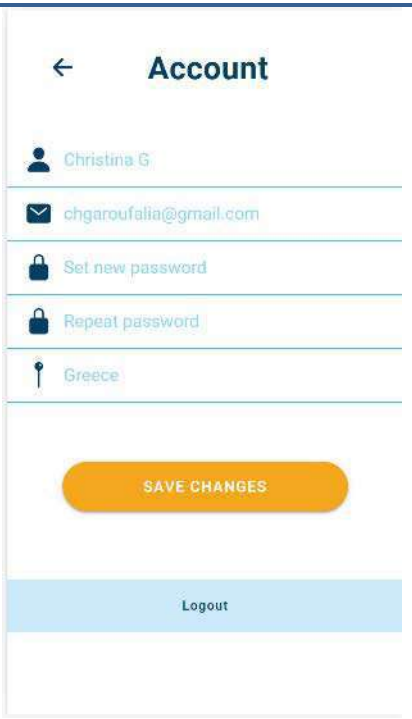
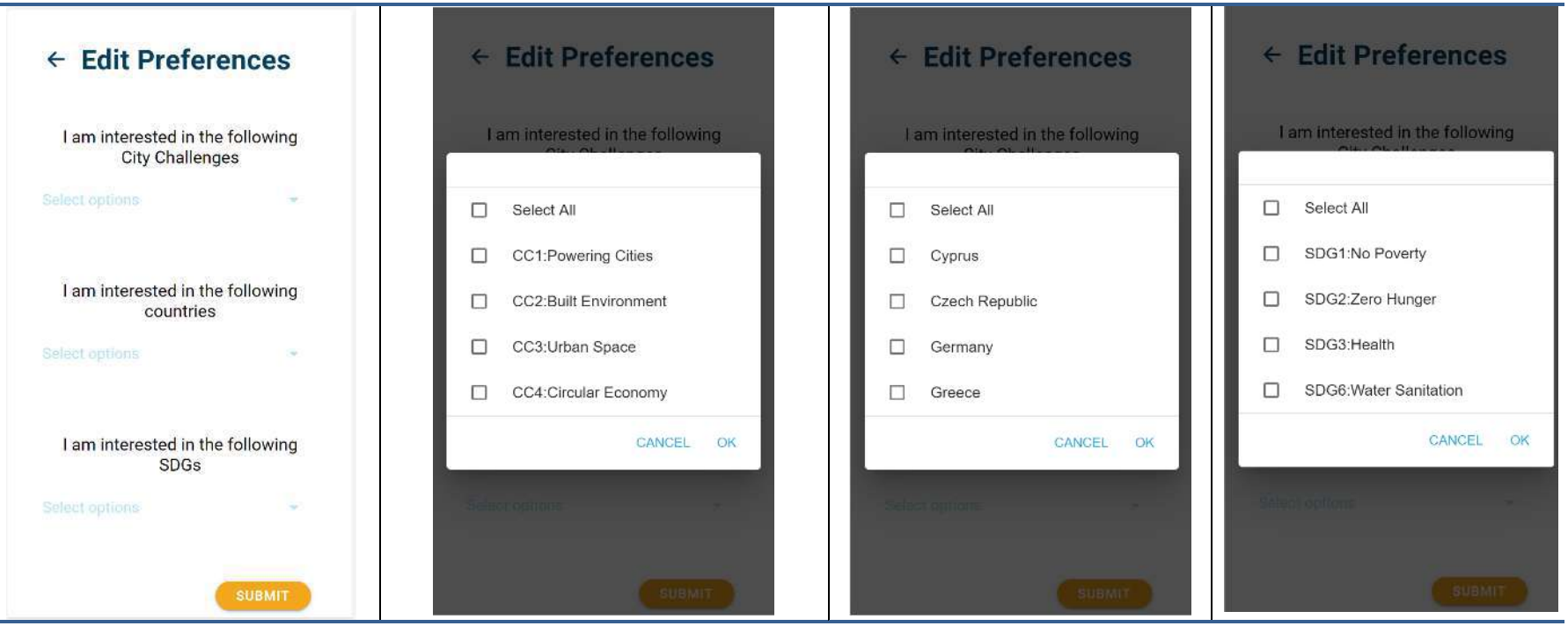
Settings		
		

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824466

Settings



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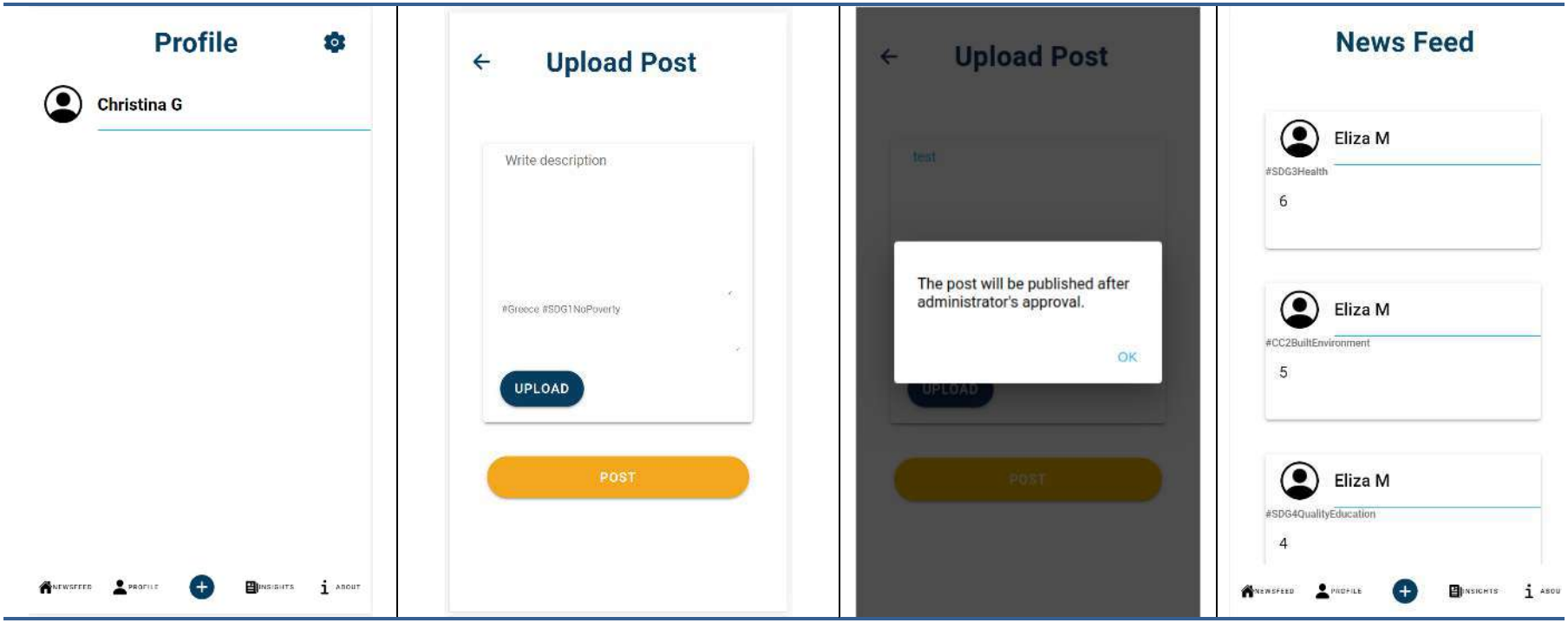
Upload post



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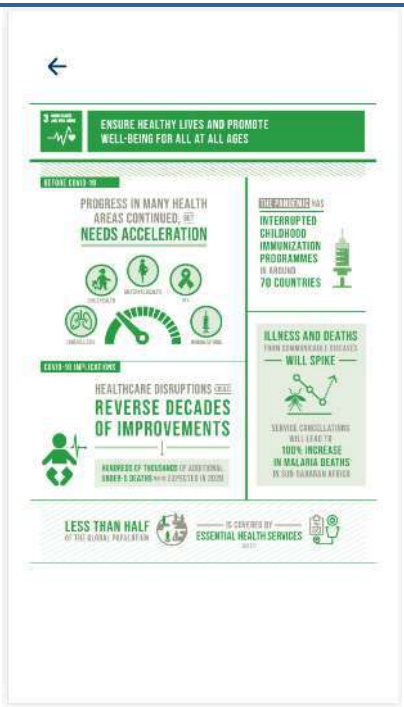
App features



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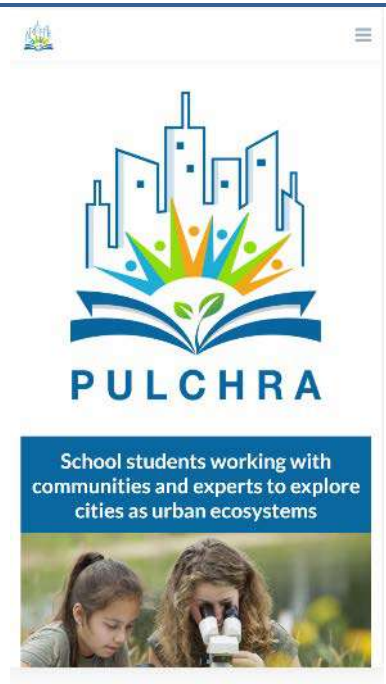
App features



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2.7 Backend Development

The PULCHRA app consists of two parts: the frontend -the user interface- and the backend -the functionalities, data processing and communication with database.

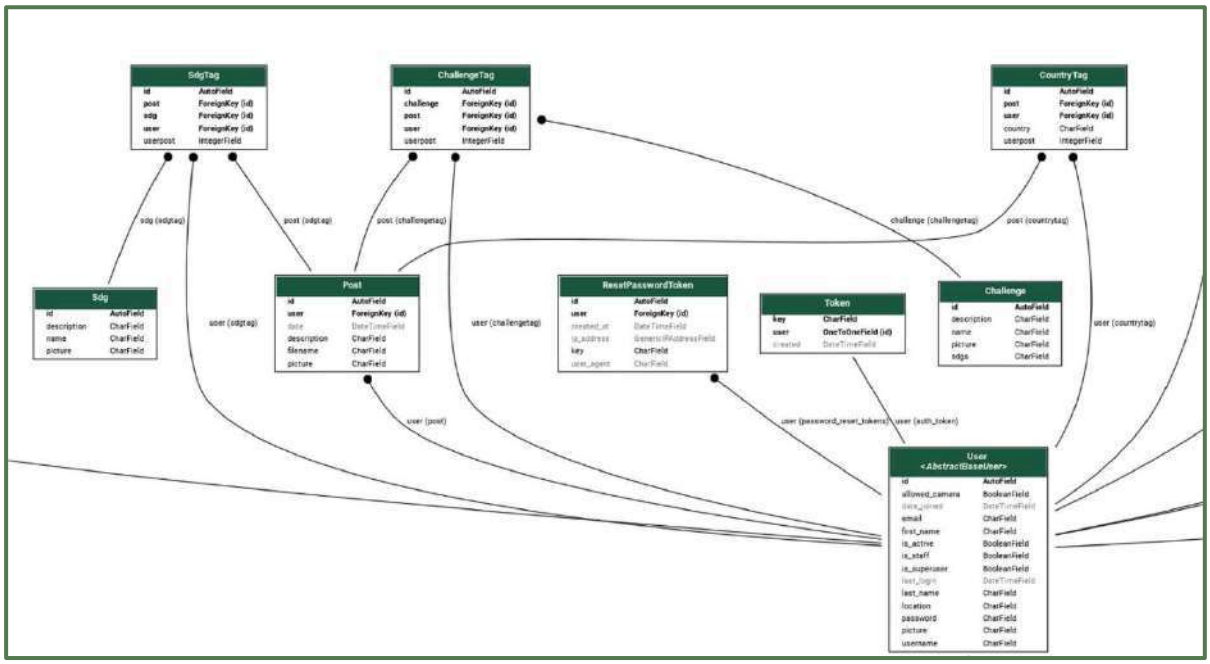
The process of backend app development begins with defining the technical requirements of the app both for frontend and backend. This is the most important step since all other steps rely on it. The daily active users, the percentage of new users per month, the responsiveness of the app, the type of functionalities it offers to its users, the time schedule of development and the platforms that it will run on, are some of the parameters that affect:

- the app design;
- the choice of the frameworks;
- the choice of database; and
- the app programming.

App design is the mapping of technical requirements and shareholders' requirements to functionalities, technical details and data organisation, such as designing database tables that will store all the information needed, design how this information will be processed and served to user and design how the user will see these information (mockups).

The choice of frameworks as mentioned above, rely solely on technical specifications and the developer's programming skills and experience. For the PULCHRA app, the frameworks chosen are Ionic, Django and SQLite database.

The database design of the PULCHRA App



2.8 Frontend Development

Building an app is quite different from building a website. For the app to be compatible to both android and iOS operating systems, developers must either write in two different programming languages or write in a cross-platform framework, such as Ionic. This is the case with the PULCHRA app. Ionic is a relatively new framework and first to offer this amazing option. Frontend app development consists of the following:

- Design;
- Functionalities;
- Responsiveness; and
- UX Design.

The design and functionalities of the PULCHRA app were described prior to the frontend development by making mockups of the whole app and the workflow. The UX Design was based on the mockups but was differentiated during the development of the app to better suit user's needs. Here are some of the aspects considered during the frontend development:

- Colour palette: the main colours used were those of the PULCHRA logo suited with SDG colours.
- Background: white colour was used as the PULCHRA app background colour both to highlight the PULCHRA logo and SDG colours and emphasise on clarity.
- Alignment: justified alignment was used in all texts.
- Text font: Roboto font was chosen to offer playfulness to the app.
- Button format: the buttons' colour, size, positions were chosen to better suit each requirement.
- Tab bar: the tab bar was chosen to facilitate user navigation with just a click.
- Tags: to facilitate posting specific tags (SDGs, etc.) are proposed to the user.

2.9 Testing

The testing phase must include both frontend and backend development check and should be meticulous to reveal all problems of the app before the user does.

The first-level testing included two basic checks, which were performed prior to first delivery of the application and aimed to check all functionalities and user experience.

The first one was performed by the developer included testing the application code, database, and server installation. The second one was performed by the team of QA analysts and project managers to ensure proper functionality, the detection of any bugs, and analysis of aesthetics. Additionally, the procedures of functional & non-functional requirements were tested thoroughly. The first-level testing process was completed in a total of 2 weeks. Note, that all the tests performed in a simulated environment of mobile and tablet devices through web browsers (Google Chrome & Mozilla Firefox). Our team also emphasised on the data privacy to ensure the users' personal data remains secured.

All functional and non-functional requirements described in the current document are fully operational. As far as the option of registering via Facebook and Google account (requirement FR_usrAuth-003) and the deployment of the app in AppStore and PlayStore concerns, all required actions have been implemented by the development team and only the related approvals by Facebook and Google are pending.

During the second-level testing, the PULCHRA Coordinator and selected PULCHRA partners participated and provided the development team with their feedback. This testing phase was focused on more specific details:

- Stretch tests by simultaneous users;
- Responsiveness tests;
- Tests for the outlooking of the app in multiple phones/ screens;
- Penetration tests, to ensure that malicious users will not exploit app vulnerabilities;
- SQL injection test, to ensure data integrity;
- Fail safe server tests; and
- Functionality tests, to eradicate programming errors.

Problems that were related to data protection, compliance to GDPR regulations and security vulnerabilities that were compromising the app to unethical users, appeared during this phase.

Therefore, after several modifications were made, a third and final phase testing took place.

2.10 Preparing Launch

Launch preparation included configuring all the app settings at PlayStore and AppleStore, building the app to executable form by iOS and android and initialising the internal testing release. This means that, at this point, the app is in the stores but can be downloaded only by group members to test it and assess its performance in a phone.

2.11 Release

Regarding the release of the app (Play Store -Google-) and App store -Apple-), all required actions have been implemented by the development team and only the related approvals are pending.

2.12 Maintenance and Support

Maintenance and technical support will be provided until the end of the PULCHRA project.

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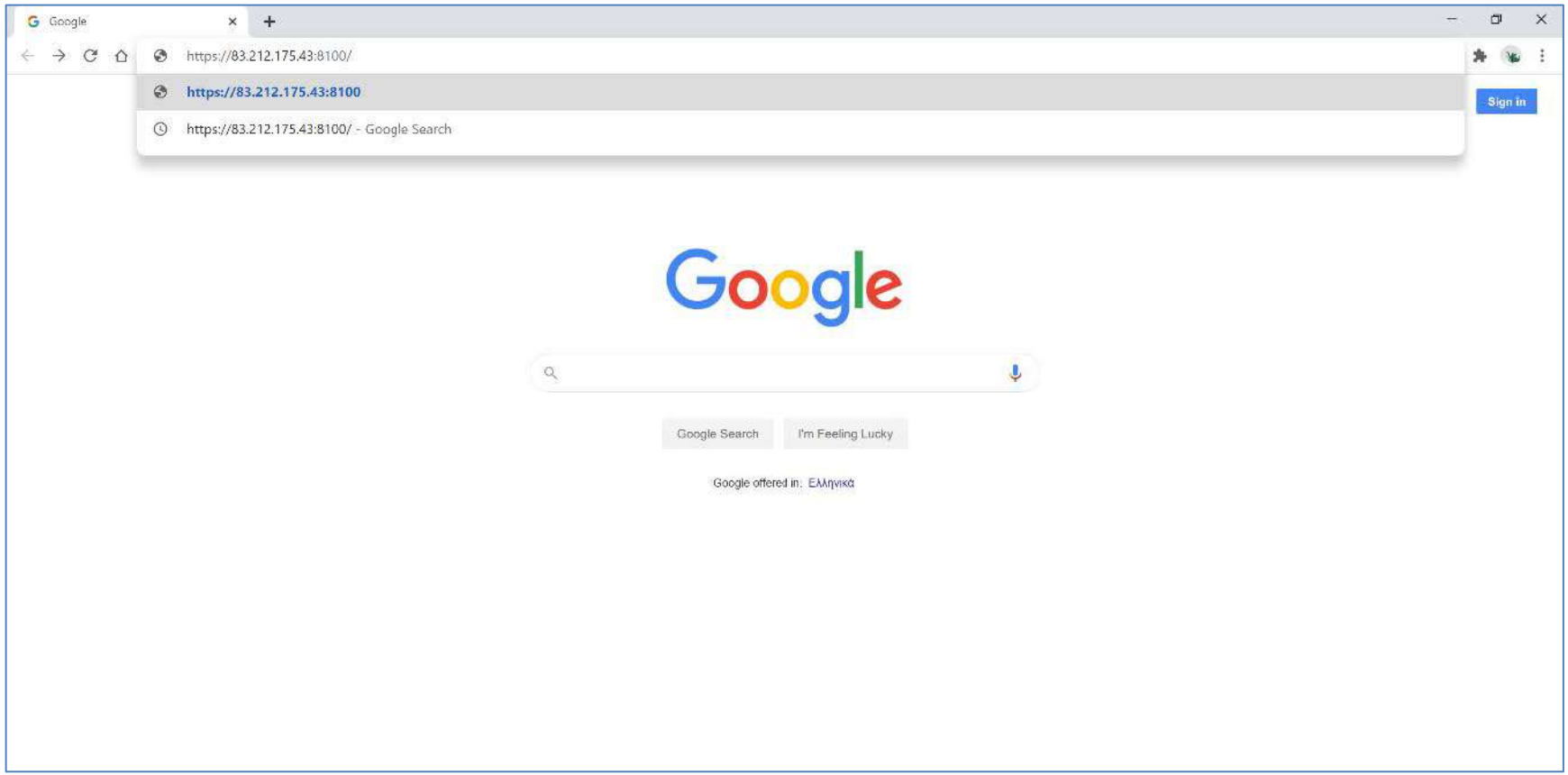
3. USER GUIDE TO ACCESS THE WEB APP

Please follow the instructions to sign-up to the PULCHRA app until it is available from the Google Play and App stores. As far as the option of registering via Facebook and Google account and the deployment of the app in AppStore and PlayStore concerns, all required actions have been implemented by the development team and only the related approvals by Facebook and Google are pending.

1) **Open google chrome browser and load http://83.212.175.43:8100/**



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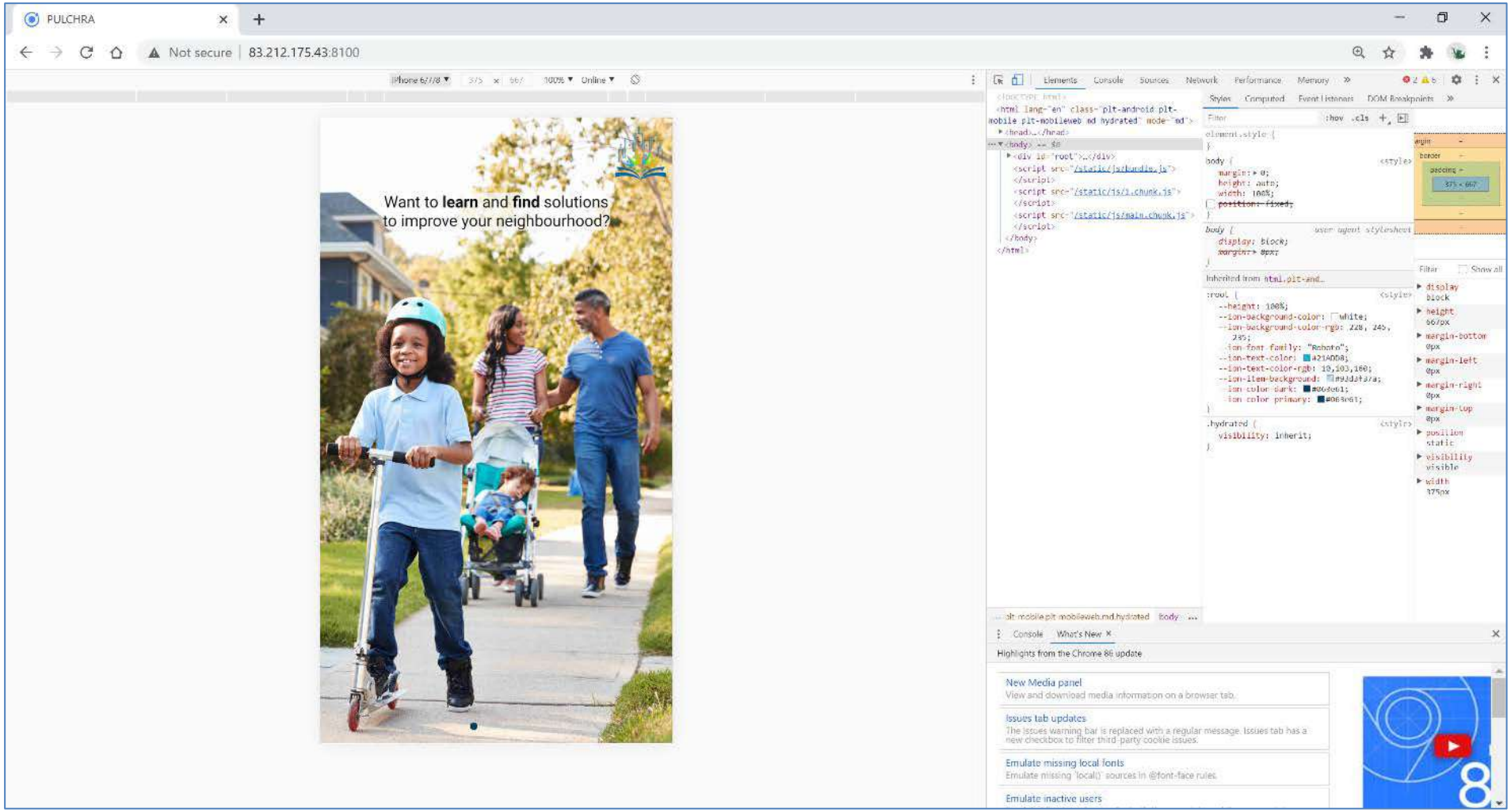
2) Press Ctrl-Shift-c at once so that you enter the developer mode



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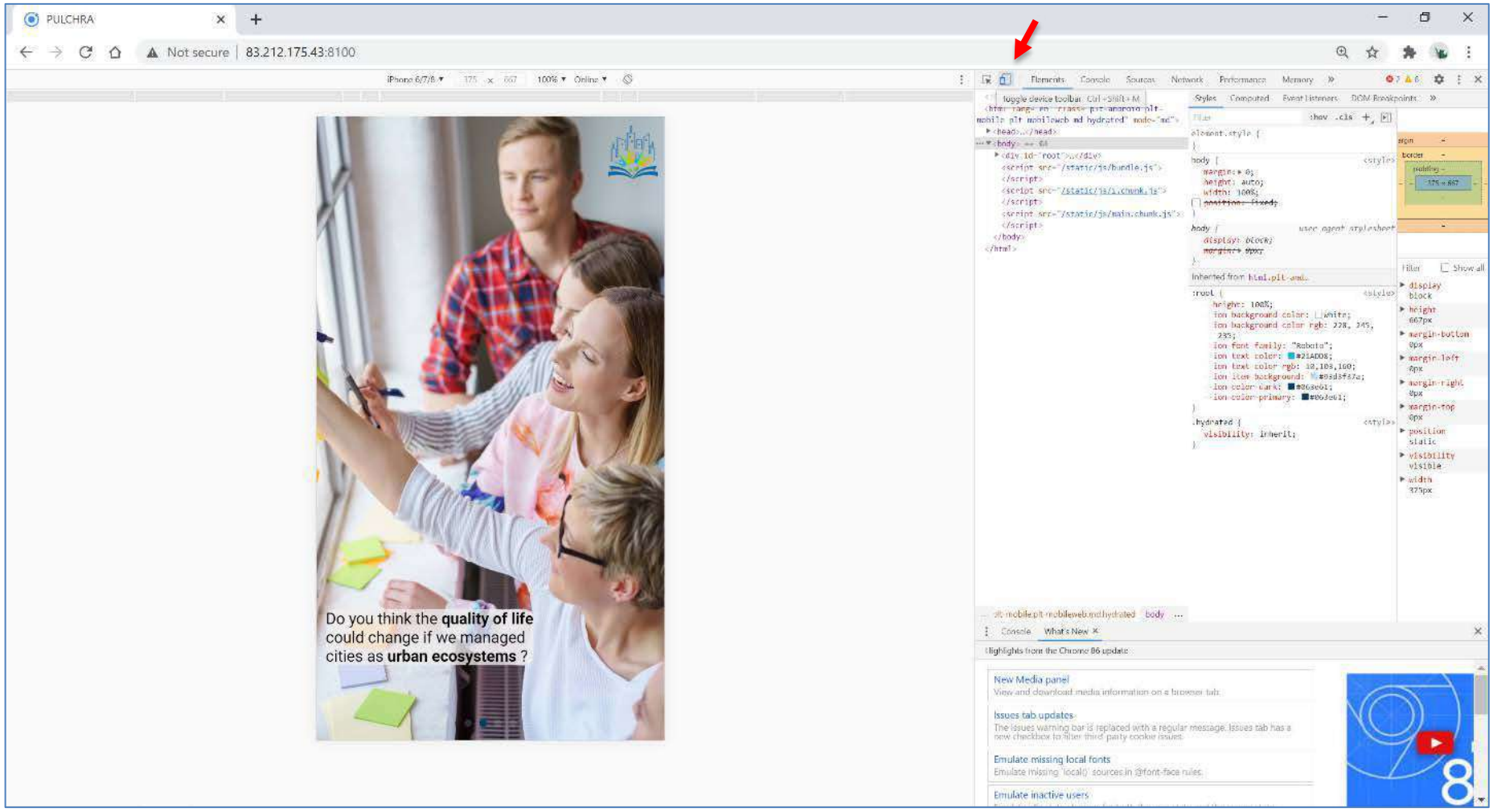
3) **On the window that pops at right, there is a bar with preferences on top of the window. Select the second option starting from left, called "Toggle device toolbar" (please check the red arrow)**



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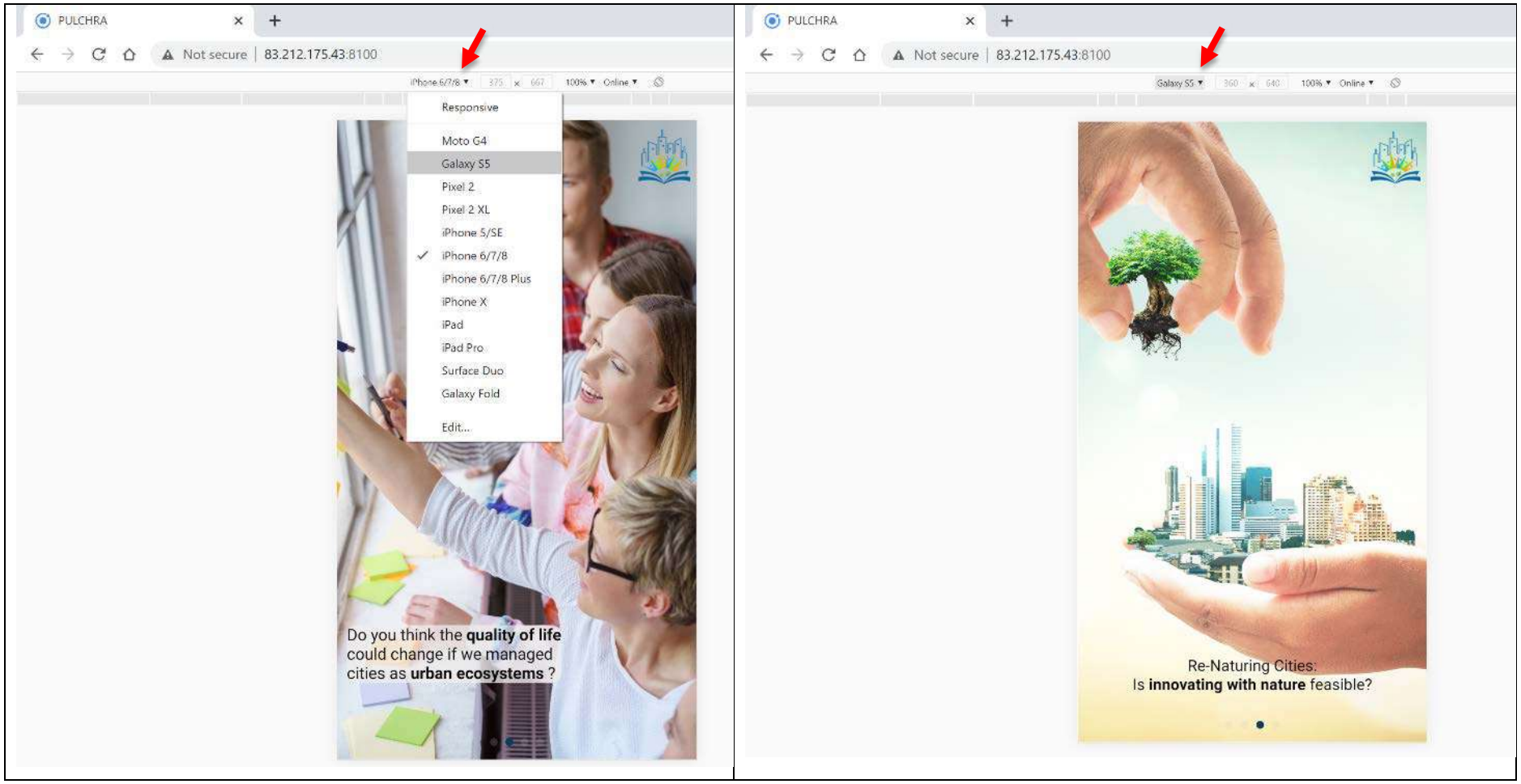
4) After pressing this button, sizes for different screens and phones are shown for emulations. Choose a Phone type (please check the red arrows)



4. CONCLUSION

The development of the PULCHRA app has been a long and demanding process. It required the communication, cooperation and coordination of people with different background, knowledge and qualifications and all PULCHRA WPs.

Functions such as databases, networking, data storage and user management had to be combined with layout aesthetics, navigation needs, graphics' creation, user interaction and data processing.

The app development team worked hard and stayed focused on the implementation of the assigned task and never lacked creativity and motivation.

5. Annex 1: App Terms of Use

The Terms of Use of the PULCHRA app are presented below.

TERMS OF USE
Last updated October 16, 2020
AGREEMENT TO TERMS

These Terms of Use constitute a legally binding agreement made between you, whether personally or on behalf of an entity ("you") and the PULCHRA project ("Project", "we", "us", or "our"), concerning your access to and use of the PULCHRA Mobile App as well as any other media form, media channel, website or mobile application related, linked, or otherwise connected thereto (collectively, the "App"). You agree that by accessing the App, you have read, understood, and agreed to be bound by all of these Terms of Use. IF YOU DO NOT AGREE TO THESE APP TERMS, YOU MUST IMMEDIATELY UNINSTALL THE APP AND DISCONTINUE ITS USE.

Supplemental terms and conditions or documents that may be posted on the App from time to time are hereby expressly incorporated herein by reference. We reserve the right, in our sole discretion, to make changes or modifications to these Terms of Use at any time and for any reason. We will alert you about any changes by updating the "Last updated" date of these Terms of Use, and you waive any right to receive specific notice of each such change. It is your responsibility to periodically review these Terms of Use to stay informed of updates. You will be subject to, and will be deemed to have been made aware of and to have accepted, the changes in any revised Terms of Use by your continued use of the App after the date such revised Terms of Use are posted.

The information provided on the App is not intended for distribution to or use by any person or entity in any jurisdiction or country where such distribution or use would be contrary to law or regulation or which would subject us to any registration requirement within such jurisdiction or country. Accordingly, those persons who choose to access the App from other locations do so on their own initiative and are solely responsible for compliance with local laws, if and to the extent local laws are applicable.

INTELLECTUAL PROPERTY RIGHTS

Unless otherwise indicated, the App is our proprietary property and all source code, databases, functionality, software, webApp designs, audio, video, text, photographs, and graphics on the App (collectively, the "Content") and the trademarks, service marks, and logos contained therein (the "Marks") are owned or controlled by us or licensed to us, and are protected by copyright and trademark laws and various other intellectual property rights and unfair competition laws of the European Union, international copyright laws, and international conventions. The Content and the Marks are provided on the App "AS IS" for your information and personal use only. Except as expressly provided in these Terms of Use, no part of the App and no Content or Marks may be copied, reproduced, aggregated, republished, uploaded, posted, publicly displayed, encoded, translated, transmitted, distributed, sold, licensed, or otherwise exploited for any commercial purpose whatsoever, without our express prior written permission.

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USER REPRESENTATIONS

By using the App, you represent and warrant that: (1) all registration information you submit will be true, accurate, current, and complete; (2) you will maintain the accuracy of such information and

promptly update such registration information as necessary; (3) you have the legal capacity and you agree to comply with these Terms of Use; (4) you are not a minor in the jurisdiction in which you reside, or if a minor, you have received parental permission to use the App; (5) you will not access the App through automated or non-human means, whether through a bot, script, or otherwise; (6) you will not use the App for any illegal or unauthorized purpose; and (7) your use of the App will not violate any applicable law or regulation.

If you provide any information that is untrue, inaccurate, not current, or incomplete, we have the right to suspend or terminate your account and refuse any and all current or future use of the App (or any portion thereof).

USER REGISTRATION

You may be required to register with the App. You agree to keep your password confidential and will be responsible for all use of your account and password. We reserve the right to remove, reclaim, or change a username you select if we determine, in our sole discretion, that such username is inappropriate, obscene, or otherwise objectionable.

PROHIBITED ACTIVITIES

You may not access or use the App for any purpose other than that for which we make the App available. The App may not be used in connection with any commercial endeavours except those that are specifically endorsed or approved by us.

As a user of the App, you agree not to:

1. Systematically retrieve data or other content from the App to create or compile, directly or indirectly, a collection, compilation, database, or directory without written permission from us.
2. Trick, defraud, or mislead us and other users, especially in any attempt to learn sensitive account information such as user passwords.
3. Circumvent, disable, or otherwise interfere with security-related features of the App, including features that prevent or restrict the use or copying of any Content or enforce limitations on the use of the App and/or the Content contained therein.
4. Disparage, tarnish, or otherwise harm, in our opinion, us and/or the App.
5. Use any information obtained from the App in order to harass, abuse, or harm another person.
6. Make improper use of our support services or submit false reports of abuse or misconduct.
7. Use the App in a manner inconsistent with any applicable laws or regulations.
8. Use the App to advertise or offer to sell goods and services.
9. Engage in unauthorized framing of or linking to the App.
10. Upload or transmit (or attempt to upload or to transmit) viruses, Trojan horses, or other material, including excessive use of capital letters and spamming (continuous posting of repetitive text), that interferes with any party's uninterrupted use and enjoyment of the App or modifies, impairs, disrupts, alters, or interferes with the use, features, functions, operation, or maintenance of the App.
11. Engage in any automated use of the system, such as using scripts to send comments or messages, or using any data mining, robots, or similar data gathering and extraction tools.
12. Delete the copyright or other proprietary rights notice from any Content.

13. Attempt to impersonate another user or person or use the username of another user.
14. Sell or otherwise transfer your profile.
15. Upload or transmit (or attempt to upload or to transmit) any material that acts as a passive or active information collection or transmission mechanism, including without limitation, clear graphics interchange formats ("gifs"), 1×1 pixels, web bugs, cookies, or other similar devices (sometimes referred to as "spyware" or "passive collection mechanisms" or "pcms").
16. Interfere with, disrupt, or create an undue burden on the App or the networks or services connected to the App.
17. Harass, annoy, intimidate, or threaten any of our employees or agents engaged in providing any portion of the App to you.
18. Attempt to bypass any measures of the App designed to prevent or restrict access to the App, or any portion of the App.
19. Copy or adapt the App's software, including but not limited to Flash, PHP, HTML, JavaScript, or other code.
20. Decipher, decompile, disassemble, or reverse engineer any of the software comprising or in any way making up a part of the App.
21. Except as may be the result of standard search engine or Internet browser usage, use, launch, develop, or distribute any automated system, including without limitation, any spider, robot, cheat utility, scraper, or offline reader that accesses the App, or using or launching any unauthorized script or other software.
22. Use a buying agent or purchasing agent to make purchases on the App.
23. Make any unauthorized use of the App, including collecting usernames and/or email addresses of users by electronic or other means for the purpose of sending unsolicited email, or creating user accounts by automated means or under false pretences.
24. Use the App as part of any effort to compete with us or otherwise use the App and/or the Content for any revenue-generating endeavour or commercial enterprise.

USER GENERATED CONTRIBUTIONS

The App may invite you to chat, contribute to, or participate in blogs, message boards, online forums, and other functionality, and may provide you with the opportunity to create, submit, post, display, transmit, perform, publish, distribute, or broadcast content and materials to us or on the App, including but not limited to text, writings, video, audio, photographs, graphics, comments, suggestions, or personal information or other material (collectively, "Contributions"). Contributions may be viewable by other users of the App and through third-party webApps. As such, any Contributions you transmit may be treated as non-confidential and non-proprietary. When you create or make available any Contributions, you thereby represent and warrant that:

1. The creation, distribution, transmission, public display, or performance, and the accessing, downloading, or copying of your Contributions do not and will not infringe the proprietary rights, including but not limited to the copyright, patent, trademark, trade secret, or moral rights of any third party.
2. You are the creator and owner of or have the necessary licenses, rights, consents, releases, and permissions to use and to authorize us, the App, and other users of the App to use your Contributions in any manner contemplated by the App and these Terms of Use.
3. You have the written consent, release, and/or permission of each and every identifiable individual person in your Contributions to use the name or likeness of each and every such

identifiable individual person to enable inclusion and use of your Contributions in any manner contemplated by the App and these Terms of Use.

4. Your Contributions are not false, inaccurate, or misleading.
5. Your Contributions are not unsolicited or unauthorized advertising, promotional materials, pyramid schemes, chain letters, spam, mass mailings, or other forms of solicitation.
6. Your Contributions are not obscene, lewd, lascivious, filthy, violent, harassing, libellous, slanderous, or otherwise objectionable (as determined by us).
7. Your Contributions do not ridicule, mock, disparage, intimidate, or abuse anyone.
8. Your Contributions are not used to harass or threaten (in the legal sense of those terms) any other person and to promote violence against a specific person or class of people.
9. Your Contributions do not violate any applicable law, regulation, or rule.
10. Your Contributions do not violate the privacy or publicity rights of any third party.
11. Your Contributions do not contain any material that solicits personal information from anyone under the age of 18 or exploits people under the age of 18 in a sexual or violent manner.
12. Your Contributions do not violate any applicable law concerning child pornography, or otherwise intended to protect the health or well-being of minors.
13. Your Contributions do not include any offensive comments that are connected to race, national origin, gender, sexual preference, or physical handicap.
14. Your Contributions do not otherwise violate, or link to material that violates, any provision of these Terms of Use, or any applicable law or regulation.

Any use of the App in violation of the foregoing violates these Terms of Use and may result in, among other things, termination or suspension of your rights to use the App.

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Project Coordinator: Constantinos Cartalis

National and Kapodistrian University of Athens, Greece

Faculty of Physics, Division of Environmental Physics and Meteorology

Zografou Campus Building PHYS-V, GR 15784 ATHENS GREECE

Contact details: ckartali@phys.uoa.gr, Tel.+302107276774